4.6 AIR QUALITY

This section describes existing ambient air quality conditions in the vicinity of the Cabrillo Port Liquefied Natural Gas Deepwater Port (the Project), air pollutant emissions associated with Project construction and operation, and the applicable major Federal, State, and local air quality regulations. Potential impacts on ambient air quality due to air pollutant emissions from the Project, as well as from alternatives to the Project, are identified. This section also summarizes the mitigation measures to be implemented to address these impacts.

Issues raised related to air quality during the public scoping and public comment periods for the October 2004 Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) are addressed. The air quality issues included identification of all Project-related and indirect air emissions, identification of specific emission offsets, availability of assumptions used in preparation of emission estimates and air quality impact analyses, sulfur content in natural gas and diesel, feasibility of best available control technology, air quality impacts during emergencies, air pollutant impacts on onshore and offshore areas due to Project construction and operation, the introduction of natural gas with elevated heating values, Federal operating permit applicability, mitigation measures, and cumulative air quality impacts.

4.6.1 Environmental Setting

4.6.1.1 Air Pollutants

Air pollutants originate from a wide variety of man-made and natural sources. Air pollution can directly impact the health of human beings, animals, and plants; reduce visibility; and cause distress to structures and buildings. Air pollution can also potentially contribute to climate change.

The Federal Clean Air Act (CAA) designates seven criteria pollutants for which primary and secondary National Ambient Air Quality Standards (NAAQS) have been promulgated. Primary standards are designed to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards are set to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. The seven criteria air pollutants are:

- Carbon monoxide (CO);
- Lead;
- Nitrogen dioxide (NO_2);
- Ozone;
- Particulate matter with an aerodynamic diameter less than or equal to 10 microns (PM_{10});

- Particulate matter with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$); and
- Sulfur dioxide (SO_2).

The State of California has established additional and/or more stringent ambient air quality standards for some of these criteria pollutants, as well as ambient air quality standards for sulfates, hydrogen sulfide (H_2S), vinyl chloride, and visibility-reducing particles. NAAQS and State Ambient Air Quality Standards are summarized in Table 4.6-1.

Toxic air pollutants, also known as hazardous air pollutants, are those pollutants that are known or suspected to cause immediate or long-term serious health effects such as cancer, reproductive effects or birth defects, or adverse environmental effects. Examples of toxic air pollutants include asbestos, benzene, dioxin, mercury, and methylene chloride. Ambient air quality standards, in general, have not been established for these pollutants. However, Federal, State, and local regulations and guidelines have been established to reduce their release to the air.

Some gases in the atmosphere affect the Earth's heat balance by absorbing infrared radiation. These layers of gas in the atmosphere can prevent the escape of heat much the same as glass in a greenhouse. Thus, global warming is often referred to as the "greenhouse effect." The gases most responsible for global warming are carbon dioxide (CO_2) and methane. It is becoming more widely accepted that continued increases in greenhouse gases will contribute to global warming, although there is uncertainty concerning the magnitude and timing of the warming trend.

4.6.1.2 Existing Air Quality

California is divided into 15 air basins. Air basin boundaries were established by grouping counties or portions of counties with similar geographic features. One or more local air districts administer air quality management within each basin. The California Air Resources Board (CARB), local air districts, private contractors, and the National Park Service operate ambient air monitoring stations to characterize ambient air quality throughout these air basins.

The various phases of Project construction and operation would occur within Ventura County, northwestern Los Angeles County, and in Federal waters. For the purposes of this document, Federal waters are defined as the Pacific Ocean outside of the boundaries of any county of California, i.e., beyond 3 nautical miles (NM) (3.5 miles or 5.6 kilometers [km]) of the mean high tide line of any mainland or island coastline.

The proposed Center Road Pipeline route would be in Ventura County and the proposed Loop 225 Pipeline route would be in Los Angeles County (within the South Coast Air Basin). The floating storage and regasification unit (FSRU) would be moored in Federal waters offshore of Ventura County.

Table 4.6-1 Summary of National and State Ambient Air Quality Standards

Pollutant	Averaging Time	National Ambient Air Quality Standards		California Ambient Air Quality Standards
		Primary	Secondary	
CO	8-hour	9 ppm[b]	-	9.0 ppm
	1-hour	35 ppm[b]	-	20 ppm
Lead	Quarter	1.5 µg/m^3	-	-
	30-day	-	-	1.5 µg/m^3
NO_2	Annual	0.053 ppm	0.053 ppm	-
	1-hour	-	-	0.25 ppm
Ozone	8-hour	0.08 ppm[c]	0.08 ppm[c]	0.070 ppm
	1-hour[a]	-	-	0.09 ppm
PM_{10}	Annual	50 µg/m^3	50 µg/m^3	20 µg/m^3
	24-hour	150 µg/m^3 [d]	150 µg/m^3 [d]	50 µg/m^3
$PM_{2.5}$	Annual	15.0 µg/m^3	15.0 µg/m^3	12 µg/m^3
	24-hour	65 µg/m^3 [e]	65 µg/m^3 [e]	-
SO_2	Annual	0.030 ppm	-	-
	24-hour	0.14 ppm[b]	-	0.04 ppm
	3-hour	-	0.5 ppm[b]	-
	1-hour	-	-	0.25 ppm
Sulfates	24-hour	-	-	25 µg/m^3
H_2S	24-hour	-	-	0.03 ppm
Vinyl chloride	24-hour	-	-	0.010 ppm
Visibility reducing particles	8-hour (10 am - 6 pm)	-	-	[f]

Sources: 40 CFR Part 50; 17 CCR §§ 70100–70201.

Key:

µg/m^3 = micrograms per cubic meter

ppm = parts per million

Notes:

[a]1-hour ozone NAAQS was replaced with the 8-hour ozone NAAQS on June 15, 2005.

[b]Not to be exceeded more than once per year.

[c]To attain this standard, the 3-year average of the fourth highest daily maximum 8-hour average concentration over year must not exceed the standard.

[d]Standard is attained when the expected number of violations is one or less each year.

[e]To attain this standard, the 3-year average of the 98th percentile must not exceed the standard.

[f]Reduce the visual range to less than 10 miles at a relative humidity less than 70 percent.

Ventura County is part of the South Central Coast Air Basin, which comprises Ventura, Santa Barbara, and San Luis Obispo Counties. The air over Ventura County often exhibits weak vertical and horizontal dispersion characteristics, which limit the dispersion of emissions and cause increased ambient air pollutant levels. Persistent temperature inversions, i.e., temperature increases as height increases, act as a "ceiling" that prevents pollutants from rising and dispersing (see discussion and Figure 4.1-4 in Section 4.1.8.5, "Meteorology and Climate"). Mountain ranges act as “walls” that inhibit horizontal dispersion of air pollutants. The diurnal land/sea breeze pattern

common in Ventura County transports air pollutants toward the ocean during the early morning by the land breeze and toward land during the afternoon by the sea breeze. This creates a "sloshing" effect, causing pollutants to remain in the area for several days. Residual emissions from previous days accumulate and chemically react with new emissions in the presence of sunlight, thereby increasing ambient air pollutant levels. This pollutant "sloshing" effect happens most predominantly from May through October (known as the "smog season"). Air temperatures are usually higher and sunlight more intense during the smog season. This explains why Ventura County experiences the most exceedances of the State and Federal ozone standards during this six-month period (Ventura County Air Pollution Control District [VCAPCD] 2003).

The South Coast Air Basin is comprised of Orange County and the non-desert portions of Los Angeles, San Bernardino, and Riverside Counties. The South Coast Air Basin is surrounded by mountains on three sides and the Pacific Ocean on the remaining side. The mountains often serve as a barrier when regional scale winds are weak. Under these conditions, air pollutants are not transported out of the basin, resulting in the build-up of pollutant concentrations. Prevailing wind patterns off the ocean carry pollutants eastward across the basin, enabling continual photochemical reactions to occur as new emissions are added to existing pollutant concentrations. Intense sunlight, present at the latitude of the basin, provides the ultraviolet light necessary to fuel the photochemical reactions that produce ozone. Compared with other urban areas in the U.S., metropolitan Los Angeles has a low average wind speed. Mild sea breezes slowly carry pollutants inland. In the summer, temperature inversions are stronger than in winter and prevent ozone and other pollutants from escaping upward and dispersing. In the winter, a ground-level or surface inversion commonly forms during the night and traps vehicle emissions during the morning rush hours (SCAQMD 1993).

The U.S. Environmental Protection Agency (USEPA) compares ambient air criteria pollutant measurements with NAAQS to assess the status of air quality of regions throughout the country with respect to criteria air pollutants. Similarly, the CARB compares air pollutant measurements in California to State Ambient Air Quality Standards. Based on these comparisons, regions in the U.S. and California are designated as one of the following categories:

- **Attainment.** A region is designated as attainment if monitoring shows ambient concentrations of a specific pollutant are less than or equal to NAAQS or State Ambient Air Quality Standards.
- **Nonattainment.** If the NAAQS or State Ambient Air Quality Standard is exceeded for a pollutant, then the region is designated as nonattainment for that pollutant. Nonattainment areas are further classified based on the severity of the exceedance of the relevant standard.
- **Unclassified.** An area is designated as unclassified if the ambient air monitoring data are incomplete and do not support a designation of attainment or nonattainment.

The Channel Islands are located in the Pacific Ocean off the coast of California. Each of these islands is a part of either Ventura County, Santa Barbara County, or Los Angeles County. Under Federal regulations, the Channel Islands that are part of Ventura or Santa Barbara County (and in the South Central Coast Air Basin) have separate air quality designations from the other parts of these counties. However, islands that are part of Los Angeles County, i.e., Catalina Island and San Clemente Island, are included with the rest of the Los Angeles County portion of the South Coast Air Basin for Federal air quality designations. California regulations do not contain separate air quality designations for any Channel Islands. The FSRU would be located in Federal waters between Anacapa Island and San Nicolas Island, which are both part of Ventura County.

A summary of the air quality designations of Ventura County, the Channel Islands, and the portion of Los Angeles County within the South Coast Air Basin is presented in Table 4.6-2. Federal designations of air quality are defined in the Code of Federal Regulations (CFR), Title 40, Part 81 (40 CFR Part 81). State designations are defined in the California Code of Regulations (CCR), Title 17, §§ 60201 through 60210 (17 CCR §§ 60201–60210).

According to the USEPA, the portions of the Pacific Ocean that are beyond the federally recognized limit of California, i.e., in Federal waters, have not been designated with respect to NAAQS (Zimpfer 2005b).

4.6.1.3 Regulated Air Pollutant Emissions

Air pollutant emissions would be generated during Project-related construction activities and facility operations. The primary regulated air pollutants from Project-related emission sources include:

- Criteria pollutants, except ozone and lead;
- Nitrogen oxides (NO_x), which include NO_2 and nitrogen oxide;
- Reactive organic compounds (ROCs); and
- Ammonia (NH_3).

Ozone is not emitted directly from emission sources but is created at near-ground level by a chemical reaction between NO_x and ROCs in the presence of sunlight. As a result, NO_x and ROCs are often referred to as ozone precursors. Project activities are also expected to emit toxic air contaminants.

Regulated Air Pollutant Emissions – Construction Activities

During Project-related construction activities, air pollutant emissions would be produced primarily from internal combustion engines used in vessels, vehicles, and equipment. Fugitive dust would also be generated by the operation of trucks and earth-moving equipment in off-road areas. Project construction would entail:

Table 4.6-2 Attainment Status of Areas of Project Activity

Pollutant	Ventura County		Channel Islands[a]		Los Angeles County[b]	
	NAAQS	California Ambient Air Quality Standards	NAAQS	California Ambient Air Quality Standards	NAAQS	California Ambient Air Quality Standards
CO	A	A	A	A	Serious NA	A
Lead	A	A	A	A	A	A
NO_2	A	A	A	A	A/M	A
Ozone[c]	Moderate NA	NA	A	NA	Severe NA	NA
PM_{10}	A	NA	A	NA	Serious NA	NA
$PM_{2.5}$	A	NA	A	NA	NA	NA
SO_2	A	A	U	A	A	A
Sulfates	-	A	-	A	-	A
H_2S	-	U	-	U	-	U
Vinyl Chloride	-	U	-	U	-	U
Visibility reducing particles	-	U	-	U	-	U

Sources: 40 CFR § 81.305; 17 CCR §§ 60201–60210.

Key:

A = attainment

A/M = attainment designated as maintenance area due to prior nonattainment designation

NA = nonattainment

U = unclassified

Extreme, severe, serious, and moderate are rankings for nonattainment status in descending order.

Notes:

[a]Refers to Channel Islands in Ventura County. Under Federal regulations, separate NAAQS designations have been established for the Channel Islands. Under State regulations, designations with respect to California Ambient Air Quality Standards for the Channel Islands (within Ventura County) are the same as those for the rest of Ventura County.

[b]Includes only the portion of Los Angeles County within the South Coast Air Basin.

[c]Status compared with NAAQS based on 8-hr averaging time; status compared with California Standards based on 1-hr averaging time.

- Installation of the mooring and tie-in of the FSRU in Federal waters;
- Installation of offshore pipelines in Federal and State waters;
- Drilling of a shoreline pipeline crossing and pipeline installation at Ormond Beach in Ventura County;
- Installation of the onshore Center Road Pipeline in Ventura County; and
- Installation of the onshore Line 225 Pipeline Loop in Los Angeles County.

Marine vessels would be used during the installation of the mooring structure, FSRU, and offshore pipelines. Vessel emission sources include diesel-fueled reciprocating internal combustion engines. Table 4.6-3 presents a summary of the anticipated types

of vessels, engine ratings, and duration of operations used to estimate air pollutant emissions from the mooring and FSRU installation.

Table 4.6-3 Mooring and FSRU Installation Equipment

Equipment Type	Total Engine Rating (hp)	Average Operating Load (percent)	Duration of Activity (days)	Average Daily Operation (hours/day)
Two anchor handling towing/supply vessels	30,000	10	20	24 (standby)
Crew boat	1,500	23	20	2 (cruising) 14 (standby)
Construction barge	8,000	43	20	12 (operating) 12 (standby)
Tug	6,500	9	20	2 (assisting) 22 (standby)
Oceangoing tug	25,000	20	1	2 (assisting) 22 (standby)

Note:
hp = horsepower.

The air pollutant sources during offshore pipeline installation include diesel-fueled reciprocating internal combustion engines on marine vessels. A summary of the anticipated types of vessels, engine ratings, and duration of operations used to estimate air pollutant emissions is presented in Table 4.6-4.

Table 4.6-4 Offshore Pipeline Installation Equipment

Equipment Type	Total Engine Rating (hp)	Average Operating Load (percent)	Duration of Activity (days)	Average Daily Operation (hours/day)
Dynamically positioned pipelaying vessel	25,000	47	35	12 (operating) 12 (standby)
Two anchor handling towing/supply vessels	30,000	10	35	24 (standby)
Crew boat	1,500	23	35	2 (cruising) 14 (standby)
Tug and pipe barge	4,000	26	10	4 (cruising) 12 (standby)
35-ton dock crane	130	80	1	8 (operating)

Note:
hp = horsepower.

The subsea pipelines would come ashore and extend beneath Ormond Beach and terminate at the existing Reliant Energy Ormond Beach Generating Station. Horizontal directional boring (HDB) technology would be used to install the pipelines below the

beach. Two borings, one for each pipeline, would be drilled to cross the shore at the landfall site. A summary of the anticipated types of equipment, engine ratings, and duration of operations used to estimate air pollutant emissions from shore crossing activities is presented in Table 4.6-5.

Table 4.6-5 Shore Crossing Construction Equipment

Equipment Type	Total Engine Rating (hp)	Average Operating Load (percent)	Duration of Activity[a]	Average Daily Operation[a]
Small drilling rig (offshore)	400	40	60 days	24 hr/day
Exit hole barge tug	4,000	5	35 days	24 hr/day
Anchor handling towing/supply vessel	15,000	10	35 days	24 hr/day
HDB equipment[b]	2,000	100	60 days (88 shifts)	12 hr/shift
Auxiliary portable equipment[c]	1,100	80	60 days (85 shifts)	12 hr/shift
All terrain forklift	100	30	60 days	12 hr/day
18-wheeler truck	-	-	60 days	60 miles/day

Notes:

hp = horsepower.

[a]The number of days used for the emissions estimates do not necessarily correspond with the number of construction days described in Chapter 2, " Description of the Proposed Action." In estimating emissions, the Applicant estimated the number of days and hours that the equipment would actually be operating. In contrast, the length of time used for the construction estimates in Chapter 2 reflects the total amount of time for site preparation, construction, anticipated downtime, and site clean-up.

[b]One in-hole head drive unit and one thrusting apparatus for only 6 hr/shift, and two mud pumps and one solids control unit (for only 9 hr/shift).

[c]One electrical generator; one mobile crane (for only 3.6 hr/shift); and three welding units (for only 6 hr/shift).

Two new onshore pipelines also would be constructed: the Center Road Pipeline in Ventura County and the Line 225 Loop Pipeline in Los Angeles County. These pipelines, along with associated facilities such as a metering station for the Center Road Pipeline, a backup odorant injection system, and block valves on both pipelines, would be installed where existing pipelines are not large enough to accommodate the proposed additional supply. The Center Road Pipeline would include installation of approximately 14.7 miles (23.7 km) of pipeline from the Reliant Energy Ormond Beach Generating Station to the Center Road Valve Station. The proposed Line 225 Loop Pipeline would include installation of approximately 7.7 miles (12.4 km) of pipeline between Quigley Valve Station and the Honor Rancho Storage Facility.

Onshore pipeline construction would be conducted using two “spreads” (workers and equipment) for the Center Road Pipeline and one spread for the Line 225 Loop Pipeline. These spreads would be working concurrently at different locations. Pipeline installation would proceed in the following general order: (1) pre-construction activities, e.g., surveying, staking, clearing, pavement cutting; (2) trenching; (3) hauling, stringing, and bending the line pipe; (4) lowering in, line-up, and welding; (5) weld inspection; (6)

application of protective coating to weld joints; (7) backfilling; (8) right-of-way (ROW) cleanup, paving, and restoration; and (9) hydrostatic testing.

Several water bodies would be crossed during onshore pipeline installation. The proposed methods for crossing the different water bodies include:

- Slick bore (uncased horizontal conventional bore);
- Cased bore (same as slick bore except pipe is enclosed in steel casing);
- Pipeline span (subaerial exposure);
- Pipe bridge installation;
- Trenching; or
- Hanging pipe under existing bridge structures.

Air pollutant emissions from the onshore pipeline installation activities would be generated by diesel and gasoline-fueled reciprocating internal combustion engines in construction equipment and trucks. Fugitive dust would also be caused by the operation of trucks and earth-moving equipment in off-road areas. Air pollutant emissions during onshore construction activities would also be generated from motor vehicles associated with worker commute trips. Offsite motor vehicle travel during offshore construction activities is anticipated to be minimal; however, since pipeline-laying barges typically house the workers onboard, thus eliminating the need for daily commuting.

Summaries of the anticipated types of equipment, engine ratings, and duration of operations used to estimate air pollutant emissions during all onshore pipeline installation activities are presented as follows:

- Trenching, including pre-construction activities (Table 4.6-6);
- Pipelaying, including activities from hauling, stringing, and bending the line pipe through hydrostatic testing (Table 4.6-7);
- Boring, for all waterways in Ventura County (Table 4.6-8); and
- Drilling, including horizontal directional drilling (HDD), for all waterways in Los Angeles County (Table 4.6-9).

The Applicant has specified that the following fugitive dust control measures would be implemented during onshore construction activities to reduce dust emissions:

- Excavation and moist spoils would be watered down;
- Spoil piles that remain more than a few weeks would be covered with tarps;
- Water trucks would be used for dust suppression; and

- Disturbed areas not covered with surface structures, such as buildings and pavements, would be stabilized following construction activities. This stabilization may involve planting these areas with suitable vegetation to minimize future on-site soil loss and off-site sedimentation.

Table 4.6-6 Onshore Pipeline Installation Equipment – Trenching

Equipment Type	Total Engine Rating (hp)	Average Operating Load (percent)	Duration of Activity[a] (days)	Average Daily Operation[a] (hours/day)
Concrete saw	50	50	180	12
Trenching machine	1,000	80	180	12
Track backhoe	500	80	180	12
Front loader	200	50	180	12
Bulldozer	200	50	180	12
Dragline	200	50	180	12

Notes:

hp = horsepower.

[a]The number of days used for the emissions estimates do not necessarily correspond with the number of construction days described in Chapter 2, "Description of the Proposed Action." In estimating emissions, the Applicant estimated the number of days and hours that the equipment would actually be operating. In contrast, the length of time used for the construction estimates in Chapter 2 reflects the total amount of time for site preparation, construction, anticipated downtime, and site clean-up.

Table 4.6-7 Onshore Pipeline Installation Equipment – Pipelaying

Equipment Type	Total Engine Rating (hp)	Average Operating Load (percent)	Duration of Activity[a] (days)	Average Daily Operation[a] (hours/day)
Miscellaneous trucks[b]	-	-	180	4
Pipe-bending machine	100	50	90	12
Auxiliary equipment[c]	1,700	50	180	12
Two dewatering pumps	100	50	30	12
Hydrostatic test pump	200	50	30	12
Cement/asphalt equipment[d]	400	50	90	12

Notes:

hp = horsepower.

[a]The number of days used for the emissions estimates do not necessarily correspond with the number of construction days described in Chapter 2, "Description of the Proposed Action." In estimating emissions, the Applicant estimated the number of days and hours that the equipment would actually be operating. In contrast, the length of time used for the construction estimates in Chapter 2, reflects the total amount of time for site preparation, construction, anticipated downtime, and site clean-up.

[b]Two dump trucks, two water trucks, two utility trucks, two pipe stringing trucks, two cement trucks, two asphalt trucks, and a lowboy truck.

[c]One heavy forklift, two sideboom tractors, one mobile crane, two welding generators, two utility compressors, two air compressors, one fill dirt screener, one sheepsfoot compactor, two vibratory rollers, and two hydraulic tampers.

[d]One cement pump, one asphalt paving machine, and one asphalt roller.

Table 4.6-8 Onshore Pipeline Installation Equipment – Boring

Equipment Type	Total Engine Rating (hp)	Average Operating Load (percent)	Duration of Activity[a] (days)	Average Daily Operation[a] (hours/day)
Horizontal boring rig	1,000	80	30	24
Track backhoe	200	50	30	12
All terrain forklift	100	50	30	12
Six light towers	120	100	30	12
Heavy lift crane	500	50	30	6
Two 18-wheeler trucks	-	-	30	4

Notes:

hp = horsepower.

[a]The number of days used for the emissions estimates do not necessarily correspond with the number of construction days described in Chapter 2, "Description of the Proposed Action." In estimating emissions, the Applicant estimated the number of days and hours that the equipment would actually be operating. In contrast, the length of time used for the construction estimates in Chapter 2 reflects the total amount of time for site preparation, construction, anticipated downtime, and site clean-up.

Table 4.6-9 Onshore Pipeline Installation Equipment – Horizontal Directional Drilling

Equipment Type	Total Engine Rating (hp)	Average Operating Load (percent)	Duration of Activity[a] (days)	Average Daily Operation[a] (hours/day)
Two large drilling rigs (HDD)	1,000	80	30	24
Auxiliary drilling equipment[b]	1,700	80	30	24
Track backhoe	200	50	30	12
All terrain forklift	100	50	30	12
Six light towers	120	100	30	12
Heavy lift crane	500	50	30	6
Two 18-wheeler trucks	-	-	30	4

Notes:

hp = horsepower.

[a]The number of days used for the emissions estimates do not necessarily correspond with the number of construction days described in Chapter 2, "Description of the Proposed Action." In estimating emissions, the Applicant estimated of the number of days and hours that the equipment would actually be operating. In contrast, the length of time used for the construction estimates in Chapter 2 reflects the total amount of time for site preparation, construction, anticipated downtime, and site clean-up.

[b]One mud cleaner generator, two mud pumps, and four fluid handling pumps.

The air pollutant emissions expected on a daily basis from each phase of construction are summarized in Table 4.6-10. Some of these activities may occur concurrently. Estimates of total air pollutant emissions due to construction are presented in Table 4.6-11. Total emissions have been separated based on the locations of the proposed construction activities, i.e., within Ventura County, Los Angeles County, or Federal waters. The methodology and assumptions used to develop these emission estimates are outlined in Appendix G1.

Table 4.6-10 Daily Air Pollutant Emissions from Project Construction Activities

Construction Activity[a]	Daily Emissions (pounds per day)					
	CO	NO_x	PM_{10}	$PM_{2.5}$	ROCs	SO_2
FSRU mooring installation	5,512	4,474	259	259	648	3.1
Offshore pipeline installation	7,051	5,726	332	332	830	4.0
Shore crossing construction	1,625	1,323	120	88	191	0.9
Onshore pipeline – trenching	413	276	31	24	43	0.3
Onshore pipeline – pipelaying	1,123	237	149	49	60	1.3
Onshore pipeline – boring	449	368	64	33	53	0.3
Onshore pipeline – HDD	1,060	865	93	62	125	0.6
Worker commuting	212	14	4	4	7	1.8

Notes:

[a]Offshore and shore crossing construction activities may occur concurrently. As appropriate, comparisons of combined daily emissions from concurrent construction activities to relevant significance thresholds are presented in Section 4.6.4, "Impacts Analysis and Mitigation."

Table 4.6-11 Total Air Pollutant Emissions from Project Construction Activities

Area	Construction Activity	Emissions (tons)					
		CO	NO_x	PM_{10}	$PM_{2.5}$	ROCs	SO_2
Ventura County	Offshore pipelines	17.9	14.5	0.8	0.8	2.1	0.010
	Shore crossing	46.4	37.8	3.5	2.5	5.5	0.027
	Onshore pipeline	88.5	33.5	10.9	4.5	6.4	0.087
	Worker commuting	7.9	0.5	0.1	0.1	0.3	0.07
	Subtotal	**160.7**	**86.4**	**15.3**	**8.0**	**14.1**	**0.19**
Los Angeles County	Onshore pipeline	56.8	27.1	6.3	2.9	4.7	0.05
	Worker commuting	6.1	0.4	0.1	0.1	0.2	0.05
	Subtotal	**62.9**	**27.4**	**6.5**	**3.0**	**4.8**	**0.10**
Federal waters	FSRU mooring	33.8	27.4	1.6	1.6	4.0	0.02
	Offshore pipelaying	101.5	82.4	4.8	4.8	11.9	0.06
	Subtotal	**135.3**	**109.8**	**6.4**	**6.4**	**15.9**	**0.08**
Total		**359**	**224**	**28**	**17**	**35**	**0.37**

Regulated Air Pollutant Emissions – Stationary Operations

The CARB states, "From an air quality perspective, all emissions associated with the Project must be included in the analysis. Directly associated emissions are those that would not occur 'but for' the Project. With the proposed LNG Project, vessel emissions of visiting tankers are direct emissions. These emissions must be counted in determining the impact of the proposed Project and whether the impact has the potential to have a significant adverse affect on air quality" (Scheible 2006). During normal Project operations, air pollutant emissions would be generated from stationary

sources on the FSRU and from marine vessels, i.e., LNG carriers, support tugs, and a crew boat.

FSRU stationary sources include the following equipment:

- Four 8,250-kilowatt (kW) generators, each powered by a dual-fuel reciprocating internal combustion engine;
- Eight submerged combustion vaporizers, each fitted with a natural gas burner with an input fuel rate of 115 million British thermal units per hour (MMBtu/hr);
- One 4,200-kW diesel emergency generator;
- One 600-kW diesel emergency firewater pump engine;
- One 56-kW diesel freefall lifeboat engine; and
- One 145,000-gallon diesel storage tank.

The four 8,250-kW generators would provide electrical power for the FSRU. Each generator would operate with either natural gas or diesel as its primary fuel. Under normal conditions, the generators would operate with natural gas as the primary fuel and diesel as the pilot fuel (at a natural gas to diesel ratio of approximately 99:1). According to the Applicant, the generators would operate on diesel only under the following conditions: (1) during an emergency if both sources of natural gas were lost; (2) for monthly tests of the emergency generator and firefighting water pumps and occasional tests of the dual fuel generator; (3) during emergency training drills; or (4) during commissioning before the first delivery of liquefied natural gas (LNG).

Submerged combustion vaporizers would be used to vaporize LNG to natural gas. submerged combustion vaporizers are heat exchangers that use water baths as the heating medium to vaporize LNG to natural gas within pipes submerged in the water baths. The water baths are maintained at a constant temperature by bubbling hot exhaust gas produced from natural gas burners through the water baths. The cooled exhaust gas is then vented to the atmosphere.

In addition to potential use in emergencies or upset conditions, the emergency generator, emergency fire pump, and freefall lifeboat engine would be operated briefly each month as part of routine maintenance procedures. Emissions from brief operation of the engines for maintenance purposes are also included in the operational emission totals.

As part of the construction permit application to the USEPA, the Applicant prepared an emission control technology analysis to identify methods to reduce air pollutant emissions from FSRU equipment. This analysis identified emission control technologies that prescribe best available control technology (BACT) requirements. The Applicant proposes to install selective catalytic reduction (SCR) and catalytic oxidation equipment to reduce NO_x, CO, and ROCs emissions from the 8,250-kW generators. SCR includes the injection of NH_3 or urea into the exhaust gas stream so that NO_x, NH_3, and oxygen react on the surface of a catalyst to form nitrogen and water. A byproduct of SCR would

be emissions of a small quantity of unreacted NH_3 (NH_3 slip), ammonium sulfate, PM_{10}, and $PM_{2.5}$. Catalytic oxidation equipment would utilize a catalyst material, most likely a precious metal such as platinum, palladium, or rhodium, to promote the oxidation of CO and ROCs to CO_2. Unlike SCR, catalytic oxidation does not require the introduction of additional chemicals for the reaction to proceed.

As outlined in the emission control technology analysis, the Applicant would install low NO_x pre-burner systems on the submerged combustion vaporizers to reduce NO_x emissions and to control ROCs and CO emissions through good combustion practices. The Applicant further proposes that the emergency generator, fire pump, and freefall lifeboat engines would be compliant with USEPA Tier 2 emission standards for off-road engines.

Estimates for the potential-to-emit (PTE) of each air pollutant from FSRU equipment are based upon the following assumptions:

- SCR and catalytic oxidation equipment would be installed on the 8,250-kW generators;
- Submerged combustion vaporizers would be fitted with low NO_x pre-burner systems;
- No more than three 8,250-kW generators or five submerged combustion vaporizers would be operated simultaneously;
- The annual electrical power production rate from all 8,250-kW generators would be restricted to a maximum of 110,903 megawatt-hours while operating on the natural gas/diesel fuel mixture. The total diesel usage in all 8,250-kW generators under diesel-only operation would be limited to 48,417 gallons per year (equivalent to 100 hours per year of operation);
- The combined operating load of all submerged combustion vaporizers would be limited to no more than 80 percent of capacity (equivalent to a total heat input rate of 460 MMBtu/hr). Total natural gas usage in all submerged combustion vaporizers would be restricted to no more than 4 billion cubic feet per year;
- Annual diesel fuel use in the emergency generator and emergency fire pump would be limited to 26,150 gallons and 4,270 gallons, respectively (equivalent to 100 hours per year of operation per unit);
- Annual diesel fuel use in the freefall lifeboat engine would be limited to 230 gallons (equivalent to 52 hours per year of operation); and
- Good combustion practices, i.e., proper equipment operation, routine equipment inspection/maintenance, and engine performance analyses, would be used at all times for all fuel burning equipment.

The annual PTE for regulated air pollutants from FSRU stationary sources is summarized in Table 4.6-12. This summary does not include emissions from marine

vessels associated with the Project. The methodology and assumptions used to develop these emission estimates are outlined in Appendix G2.

Table 4.6-12 Air Pollutant Potential to Emit from FSRU Equipment

Description	Annual Potential-to-Emit (tons per year)						
	CO	NH_3	NO_x	PM_{10}	$PM_{2.5}$	ROCs	SO_2
8,250-kW generators (natural gas/diesel-pilot fuel)	18.0	5.5	13.3	7.7	7.7	20.6	0.07
8,250-kW generators (diesel only)	0.2	0.05	1.9	0.1	0.1	0.3	0.01
Submerged combustion vaporizers	148.9	-	48.9	3.8	3.8	3.5	0.3
Emergency generator and emergency fire pump engine	1.9	-	3.0	0.1	0.1	0.4	0.003
Freefall lifeboat engine	0.02	-	0.02	0.001	0.001	0.003	0.00002
Diesel fuel storage tank	-	-	-	-	-	0.03	-
Total	**169.0**	**5.5**	**67.1**	**11.7**	**11.7**	**24.8**	**0.4**

During normal operations, three types of vessels would be involved with Project activities: LNG carriers, tugboats, and a crew/supply boat.

LNG carriers would berth at the FSRU an average of two to three times per week to transfer LNG. The total time for LNG carrier berthing, unloading, and de-berthing would take approximately 18 to 24 hours, with LNG unloading lasting over a period of 16 to 22 hours, depending on the size of the LNG carrier. While berthed at the FSRU, the LNG carrier would continue to operate its engines in order to supply electrical power for the LNG transfer pumps and other miscellaneous vessel processes. The LNG transfer pumps are used to pump the LNG from LNG carrier storage tanks to FSRU storage tanks.

Two Project-dedicated tugboats would assist the LNG carrier in transit to and berthing with the FSRU and would patrol the safety zone during unloading operations. Once a week, one of the tugboats would make a roundtrip to Port Hueneme to get supplies for the FSRU. The tugboats would remain on standby at the FSRU at all other times. In addition, a Project-dedicated crew/supply boat would be used to transport FSRU and LNG carrier crew members to and from shore.

To reduce Project emissions, the Applicant has proposed to use natural gas as the primary fuel in the main and auxiliary engines on the LNG carriers, tugboats, and crew/supply boat at all times while these vessels are berthed at the FSRU or operating within 25 NM (29 miles or 46 km) of the coast of California. Diesel would be used simultaneously as a pilot fuel, resulting in a fuel mixture with a natural gas to diesel ratio of approximately 99:1. Boil-off gas generated from the LNG carrier storage tanks would be used as fuel on the LNG carriers. By maintaining a specified amount of LNG in the LNG carrier cargo tanks after transfer operations, the LNG carrier would be able to

operate on boil-off gas until it is beyond 25 NM (29 miles or 46 km) of the coast of California. Natural gas on the tugboats and crew/supply boat would be generated from LNG stored and vaporized with heat exchanger systems located on each vessel.

Estimates of the air pollutant emissions from Project vessels are based on the following assumptions:

- LNG carriers, tugboats, and the crew/supply boat would operate only with natural gas as the primary fuel while operating in State waters and in Federal waters within 25 NM (29 miles or 46 km) of the coast of California;
- The number of LNG carrier berthings at the FSRU would be limited to 130 per year;
- The LNG carrier engines would operate at a maximum rating of 5,440 brake-horsepower over the entire duration of berthing to the FSRU;
- A tugboat would make an average of 1 roundtrip between the FSRU and Port Hueneme each week (equivalent to 52 roundtrips per year);and
- The crew/supply boat would make an average of 3.5 roundtrips between the FSRU and Port Hueneme each week (equivalent to 182 roundtrips per year).

The estimated annual emissions from vessels associated with normal Project operations are summarized in Table 4.6-13. The methodology and assumptions used to develop these emission estimates is outlined in Appendix G2.

Table 4.6-13 Air Pollutant Emissions from Project Vessels – Normal Operations

Location	Vessel Type	Annual Emissions (tons per year)					
		CO	NO_x	PM_{10}	$PM_{2.5}$	ROCs	SO_2
Ventura County waters	Tugboats	0.5	0.7	0.009	0.009	0.1	0.0002
	Crew/supply boat	0.3	0.4	0.005	0.005	0.06	0.0001
	Subtotal	**0.8**	**1.1**	**0.014**	**0.014**	**0.2**	**0.0003**
Federal waters	LNG carrier	45.5	69.2	0.9	0.9	9.6	0.01
	Tugboats	60.3	91.7	1.2	1.2	12.8	0.02
	Crew/supply boat	1.4	2.1	0.03	0.03	0.3	0.0005
	Subtotal	**107.2**	**163.0**	**2.1**	**2.1**	**22.7**	**0.03**
Total		**108.0**	**164.1**	**2.1**	**2.1**	**22.9**	**0.03**

Regulated Air Pollutant Emissions – FSRU Start-Up Activities

The startup and commissioning of the FSRU would last approximately 60 days. This startup period would begin when the FSRU is moored to the sea floor (currently scheduled for May 1, 2010) and would end with the first LNG delivery (currently scheduled for July 1, 2010). Air pollutant emissions during this startup period were calculated based on the following assumptions:

- Two 8,250-kW generators would operate with diesel fuel only at 75 percent electrical load (total electrical output of 12.4 MW) for 24 hours per day over the entire 60-day startup period (equivalent to 1,440 machine-hours or 17,800 megawatt-hours;
- SCR and oxidation catalyst equipment would operate 24 hours per day to control emissions from the 8,250-kW generators;
- Each emergency fire pump engine and emergency generator would operate at 100 percent load for 16 hours;
- The freefall lifeboat engine would operate at 100 percent load for eight hours; and
- The submerged combustion vaporizers would not operate.

The estimated emissions associated with the FSRU startup are summarized in Table 4.6-14. The calculations and detailed assumptions used to develop these emission estimates are outlined in Appendix G3.

Table 4.6-14 Air Pollutant Emissions from FSRU Stationary Sources During Start-Up

Description	Annual Potential-to-Emit (tons per year)						
	CO	**NH_3**	**NO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROCs**	**SO_2**
8,250-kW generators (diesel only)	4.2	1.0	41.8	3.1	3.1	5.8	0.1
Emergency generator and emergency fire pump engine	0.3	-	0.5	0.02	0.02	0.1	0.0005
Freefall lifeboat engine	0.003	-	0.003	0.0002	0.0002	0.0005	0.00001
Diesel fuel storage tank	-	-	-	-	-	0.005	-
Total	**4.5**	**1.0**	**42.3**	**3.1**	**3.1**	**5.9**	**0.1**

4.6.1.4 Greenhouse Gas Emissions

In addition to regulated air pollutants, the Project would generate emissions of the greenhouse gases CO_2 and methane. A substantial amount of CO_2 would be formed as a primary product of combustion of natural gas and diesel. A much smaller amount of methane would be emitted from Project equipment as uncombusted natural gas. A small portion of LNG would be vaporized from LNG carrier or FSRU storage tanks, i.e., boil-off gas. Boil-off gas is essentially natural gas comprised primarily of methane with smaller amounts of ethane and other longer chained hydrocarbons. During normal Project operation, boil-off gas would be used as fuel on LNG carriers and the FSRU. However, direct releases of boil-off gas to the atmosphere would take place only during an upset condition.

During normal operations, FSRU stationary sources and Project vessels would generate annual CO_2 emissions of approximately 270,000 and 21,000 tons per year, respectively. FSRU startup operations would generate an additional 10,000 tons of CO_2. Project construction activities would also generate approximately 17,000 tons of CO_2 emissions.

4.6.2 Regulatory Setting

Ambient air quality and air pollutant emissions from stationary and mobile sources are managed under a framework of Federal, State, and local rules and regulations. The USEPA is the principal administrator responsible for overseeing enforcement of Federal CAA statues and regulations. The CARB is the primary administrator for State air pollution and air quality management rules and regulations. The Ventura County Air Pollution Control District (VCAPCD) is the administrator of Ventura County air pollution rules, and the South Coast Air Quality Management District (SCAQMD) is the administrator of air pollution rules for the South Coast Air Basin, which includes the non-desert portion of Los Angeles County.

Project-related activities that would occur within Ventura County or the South Coast Air Basin would be subject to all pertinent Federal and State regulations, as well to the applicable VCAPCD or SCAQMD air pollution rules. The administration of air quality regulations and permits for Project activities in Ventura County and Los Angeles County would be under the jurisdiction of the VCAPCD and the SCAQMD, respectively.

Pursuant to the Deepwater Port Act, the USEPA has jurisdiction to administer air quality regulations and required air quality permits for applicable Project activities that occur outside of the boundaries of California counties, including operation of the FSRU. This regulation further stipulates that these Project activities would be subject to all Federal rules and regulations and to those of the “nearest onshore area,” i.e., Ventura County. Thus, Project activities are also subject to applicable rules and regulations of the State of California and of the VCAPCD.

The FSRU would be located 12.01 NM (13.83 miles or 22.25 km) offshore Ventura County. In order to clarify the regulatory status of the FSRU, the USEPA states, "Based on our further analysis of the Deepwater Port Act and the District (VCAPCD) rules, we have concluded offsets are not required for sources constructed in the area where BHP plans to site its FSRU, which is approximately 14 miles offshore from Ventura County. The District rules, generally speaking, include two sets of requirements – one for sources constructed on or near shore and one for sources constructed on the Channel Islands designated unclassifiable/attainment within the South Central Coast Air Basin. Since the proposed facility will be located in an area between these two areas, the USEPA must exercise its discretion to determine which of these two sets of requirements is more appropriately applied to the FSRU. As a result of this consideration, we plan to propose to permit the BHP Facility in the same manner as sources in the Federal attainment area would be permitted, i.e., in the same manner as sources on the Channel Islands." (Zimpfer 2005a) The USEPA has indicated that it

would propose to issue an Authority to Construct permit in accordance with VCAPCD Rule 10 for the FSRU.

A summary of major Federal, State, and local rules and regulations related to air quality and the applicability of each rule/regulation to the Project is presented in Table 4.6-15.

Table 4.6-15 Major Laws, Regulatory Requirements, and Plans for Air Quality

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
Federal	
National Primary and Secondary Ambient Air Quality Standards 40 CFR Part 50 - *USEPA*	• Primary and secondary ambient air quality standards designated to protect public health and welfare. • *Project Applicability:* - Air quality impacts caused by emissions related to Project activities would be compared with NAAQS.
Determining Conformity of General Federal Actions to State or Federal Implementation Plans 40 CFR Part 51, Subpart W and 40 CFR Part 93, Subpart B - *USEPA, VCAPCD, SCAQMD*	• This regulation is cited by reference in VCAPCD Rule 220 and SCAQMD Rule 1901. • Federal agencies must determine if a Federal action conforms to the applicable State Implementation Plan. • A General Conformity Rule determination is required for each pollutant where the total of direct and indirect emissions in a nonattainment or maintenance area would equal or exceed specified thresholds or are deemed to be regionally significant. • *Project Applicability (FSRU operations):* - The USEPA is regulating the FSRU as though it were in the Channel Islands. Federal actions in the Channel Islands are not subject to this regulation because the region is not classified as a Federal nonattainment or maintenance area for any criteria pollutant. Thus, the proposed issuance of a permit under the Deepwater Port Act and any emissions directly related to FSRU operations would not be subject to this regulation. • *Project Applicability (activities in Ventura County):* - Ventura County is classified as a Federal ozone nonattainment area. Project construction activities in the County would require a permit from at least one Federal agency. However, anticipated construction emissions in Ventura County are less than the applicability thresholds for this regulation. • *Project Applicability (activities in Los Angeles County):* - Los Angeles County is classified as a Federal nonattainment for a number of criteria pollutants. Project construction activities in the County would require a permit from at least one Federal agency. An analysis of the anticipated construction emissions in Los Angeles County indicates that these emissions are subject to the General Conformity Rule (see Appendix G4 of this document).

Table 4.6-15 Major Laws, Regulatory Requirements, and Plans for Air Quality

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
Prevention of Significant Deterioration (PSD) 40 CFR § 52.21 - *USEPA*	• Requires that new major stationary sources and major modifications be reviewed prior to construction to ensure compliance with NAAQS, PSD air quality increments, and BACT. • Applies only to significant emission increases of pollutants for which the area has been designated as attainment or unclassified. • A source is defined as a "major stationary source" if: - It is classified in one of the 28 named source categories and it has a PTE equal to or greater than 100 tons per year of any pollutant regulated under the CAA; or - It is any other stationary source that has a PTE equal to or greater than 250 tons per year of any pollutant regulated under the CAA. • *Project Applicability:* - The USEPA has determined that the FSRU is not subject to PSD regulations because the overall function of the FSRU does not meet the definition of one of the 28 named source categories and the PTE of air pollutants emitted from FSRU stationary sources is less than 250 tons per year.
State	
Sulfur Content of Diesel Fuel 13 CCR 2281 - *CARB*	• By September 2006, the sulfur content of vehicular diesel fuel sold or supplied in California must not exceed 15 ppm by weight. • As stipulated in 13 CCR 2299 and 17 CCR 93114, non-vehicular diesel fuel is subject to the sulfur limits specified in this regulation. • *Project Applicability:* - Diesel supplied in California for Project vehicles, vessels, and equipment would be subject to this regulation and, therefore, must have a sulfur content less than or equal to 15 ppm by weight.
Specifications for Compressed Natural Gas 13 CCR 2292.5 - *CARB*	• Contains specifications for compressed natural gas used as an alternative motor vehicle fuel. • Standards listed for content of methane, ethane, higher chained hydrocarbons, sulfur, and other compounds that can be present in compressed natural gas. • *Project Applicability:* - The Project would not be directly subject to this regulation. However, any compressed natural gas created from natural gas from the Project would be required to conform to all requirements of this regulation.
Standards for Non-vehicular Diesel Fuel Used in Diesel-Electric Intrastate Locomotives and Harborcraft 13 CCR 2299 - *CARB*	• By January 2007, non-vehicular diesel fuel sold or supplied in California for locomotives or harborcraft will be subject to all of the requirements of 13 CCR 2281 (sulfur content), 13 CCR 2282 (aromatic hydrocarbons content) and 13 CCR 2284 (lubricity) applicable to vehicular diesel fuel and shall be treated under those sections as if it were vehicular diesel fuel. • *Project Applicability:* - Diesel supplied in California for Project vessels would be subject to this regulation and would be required to meet the sulfur content limits stipulated in 13 CCR 2281.

Table 4.6-15 Major Laws, Regulatory Requirements, and Plans for Air Quality

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
Ambient Air Quality Standards 17 CCR 70100-70201 - *CARB*	• Ambient air quality standards designated in California to protect public health and welfare. • *Project Applicability:* - Air quality impacts caused by emissions related to Project activities would be compared with California ambient air quality standards.
Airborne Toxic Control Measure to Reduce Particulate Emissions from Diesel-Fueled Engines - Standards for Non-vehicular Diesel Fuel 17 CCR 93114 - *CARB*	• California non-vehicular diesel fuel is subject to all of the requirements of 13 CCR 2281 (sulfur content), 13 CCR 2282 (aromatic hydrocarbons content), and 13 CCR 2284 (lubricity) applicable to vehicular diesel fuel and shall be treated under those sections as if it were vehicular diesel fuel, provided that these requirements do not apply to diesel fuel offered, sold, or supplied solely for use in locomotives or marine vessels. • *Project Applicability:* - Diesel supplied in California for Project non-road equipment and stationary sources would be subject to this regulation and must meet the sulfur content limits stipulated in 13 CCR 2281.
Standards for Gas Service in the State of California General Order 58-A - *California Public Utilities Commission (CPUC)*	• Applies to any public utility that supplies natural gas within California where gas service is subject to the jurisdiction of the CPUC. • Requires each utility to establish and maintain a standard heating value for its product. • Contains limits for the content of H_2S and total sulfur in natural gas. • *Project Applicability:* - The quality of natural gas distributed in Southern California from the Project would be subject to a tariff agreement negotiated between the Applicant and SoCalGas. Tariff agreements, and the pipeline-quality gas specifications contained within, must be approved by the CPUC to ensure public health and safety for end-users and protection of the environment (particularly air quality).
California Coastal Act § 30253 (3) - *California Coastal Commission (CCC)*	• Requires that new development maintain consistency with the requirements of the applicable air pollution control district or the CARB. • *Project Applicability:* - The Project would be required to comply with requirements stipulated by the VCAPCD, the SCAQMD, and the CARB.
Local	
New Source Review (NSR) VCAPCD Rule 26 - *USEPA, VCAPCD*	• Requires new, replacement, modified, or relocated stationary sources in Ventura County that emit PM_{10}, NO_x, ROCs, or SO_2 to be equipped with BACT for these pollutants. • Requires emission offsets for sources where the PTE of these pollutants is greater than or equal to the specified thresholds. • Sources located on San Nicolas and Anacapa Islands are exempt from Rule 26. • *Project Applicability:* - Based on an analysis of the Deepwater Port Act and VCAPCD rules, the USEPA concluded that Rule 26 does not apply to the FSRU and that emission offsets are not required for Project sources constructed in the area where the FSRU is proposed to be sited (Zimpfer 2005a).

Table 4.6-15 Major Laws, Regulatory Requirements, and Plans for Air Quality

Law/Regulation/Plan/ Agency	Key Elements and Thresholds; Applicable Permits
Permits Required VCAPCD Rule 10 - *USEPA, VCAPCD*	• An Authority to Construct shall be required for any new, modified, relocated, or replacement emissions unit at a stationary source. • A person shall not operate, use, or offer for use any emissions unit at a stationary source without first obtaining a Permit to Operate. • *Project Applicability:* - The USEPA would propose an Authority to Construct for the FSRU under this rule.
Part 70 Permits VCAPCD Rule 33 - *USEPA, VCAPCD*	• Rule complies with operating permit program requirements specified in 40 CFR Part 70 (referred to as Part 70 or Title V permit requirements). • Part 70 permits are required for stationary sources defined as "Major Sources" in 40 CFR Part 70 (and referenced in VCAPCD Rule 33) • Permit specifies all emission standards, recordkeeping and testing requirements, and compliance assurance measures applicable to the emission units of the stationary source. • *Project Applicability:* - The FSRU would be required to obtain a Part 70 permit because the annual PTE of CO would exceed the major source threshold of 100 tons per year.
Fugitive Dust SCAQMD Rule 403 - *SCAQMD*	• Reduces the amount of particulate matter entrained in the ambient air as a result of anthropogenic (manmade) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions. • Applies to any activity or man-made condition capable of generating fugitive dust. • *Project Applicability:* - Project construction activities within Los Angeles County would be required to comply with all applicable provisions of this rule.

Under General Conformity Rule requirements, Federal agencies must determine if a Federal action conforms to the applicable State Implementation Plan. A General Conformity Rule determination is required for each pollutant where the total of direct and indirect emissions in a nonattainment or maintenance area would equal or exceed specified thresholds or are deemed to be regionally significant.

A General Conformity Rule determination would be required for Project construction activities in Los Angeles County since these activities would require issuance of permit(s) from at least one Federal agency, and the NO_x emissions generated from these activities would exceed applicable NO_x emission thresholds. The U.S. Coast Guard, as the lead Federal agency, would prepare a General Conformity Rule determination to ensure these activities conform with the applicable State Implementation Plan (SIP). Pursuant to this determination, the Applicant has indicated that it would fully offset NO_x emissions associated with construction activities in Los Angeles County by acquiring emission offsets or through a similarly enforceable measure so that there would be no net increase in NO_x emissions. The emission amounts of other air pollutants, for which Los Angeles County is designated as a Federal nonattainment or maintenance area, i.e., CO, PM_{10}, $PM_{2.5}$, and ROCs, would be less than applicable emission thresholds for General Conformity Rule requirements.

Ventura County is designated as a Federal nonattainment area for ozone. However, since NO_x and ROC emissions from Project activities in Ventura County would be less than applicable emission thresholds and would not be considered regionally significant, a General Conformity Rule determination would not be required for these emissions.

Emissions associated with the FSRU and Project vessels would not be subject to the General Conformity Rule since the Channel Islands and Federal waters are not designated as a Federal nonattainment or maintenance area.

The quality of natural gas distributed in Southern California from the Project would be subject to a tariff agreement negotiated between the Applicant and SoCalGas. Tariff agreements, and the pipeline-quality gas specifications contained within, must be approved by the CPUC to ensure public health and safety for end-users and protection of the environment (particularly air quality). Tariff agreements would be subject to renegotiation and change over the life of the Project if market conditions change or if regulatory requirements are modified. SoCalGas' existing tariff agreements with other suppliers require compliance with Rule 30, "Transportation of Customer-Owned Gas" (SoCalGas 1997). Rule 30 includes of the following specific requirements that must be met for any natural gas distributed in Southern California, regardless of whether the gas is produced in California or imported from other U.S. or international gas reservoirs:

- Concentration limits for a number of substances, including H_2S, mercaptan sulfur, total sulfur, moisture or water content, CO_2, oxygen, inerts, and hydrocarbons;
- Specific acceptance criteria for gross heating values, which must be between 970 British thermal units per dry standard cubic foot (Btu/dscf) and 1,150 Btu/dscf;
- Specific acceptance criteria to ensure interchangeability of natural gas from different sources, including the American Gas Association's Wobbe number, lifting index, flashback index, and yellow tip index; and
- A prohibition on acceptance of natural gas shipments that "contain hazardous substances (including but not limited to toxic and/or carcinogenic substances and/or reproductive toxins) concentrations which would prevent or restrict the normal marketing of the gas, be injurious to pipeline facilities, or which would present a health and/or safety hazard to Utility employees and/or the general public."

Natural gas delivered to and used in California is also regulated through CPUC General Order 58-A, Standards for Gas Service in the State of California, which sets standards for the heating value and purity of natural gas. The heating value standard requires uniform quality of the gas supplied but does not specify an average, minimum, or maximum heating value. The Applicant would be required to meet these standards and any other applicable gas standards in effect during Project operations.

Natural gas is a gaseous mixture primarily composed of methane, with small amounts of more complex hydrocarbons such as ethane, propane, butane, and pentane. The heating value of natural gas typically fluctuates, depending on its hydrocarbon

composition. Higher concentrations of more complex hydrocarbons usually result in higher heating values. Combustion of natural gas with elevated higher heating values results in increased combustion temperature and, possibly, increased NO_x emissions. Combustion of natural gas with uncharacteristically higher heating values could increase stationary source NO_x emissions by greater than 20 percent according to testing conducted by the SCAQMD on two pieces of non-residential natural gas fired equipment (SCAQMD 2003).

Historically, natural gas in the South Coast Air Basin has an average energy content of about 1,020 Btu/dscf and a Wobbe number of about 1,332 (SCAQMD 2005). These values are less than the energy content and Wobbe number limits under existing SoCalGas Rule 30.

Several factors relating to the natural gas to be delivered by the Applicant are not known at this time: (1) the precise heat content of the natural gas to be imported, other than it will meet the then existing standards, as described above, for such imports; (2) the sector of SoCalGas's market to which the gas will be diverted, e.g., there is no known, dedicated end user or designated sector for the supply; (3) the character of the natural gas with which the gas received from the Applicant may be blended within the SoCalGas distribution system and the resultant heat content of such blend; and (4) whether the gas will be consumed within the South Coast Air Basin. While the potential exists for changes in NO_x emissions due to the burning of natural gas with higher heating values than that acceptable to the SCAQMD, i.e., 1,360 on the Wobbe index, it would be speculative, based on the above factors, to determine that such would be the case and to subsequently attempt to quantify any related changes in emission levels within the South Coast Air Basin. Further, even if such calculations were feasible at this time, the mitigation of such increased emissions is beyond the jurisdiction of the California State Lands Commission (CSLC).

4.6.3 Significance Criteria

For the purposes of this document, impacts on air quality are considered significant if the Project:

- Results in a cumulatively considerable net increase of any criteria pollutant for which the region is in nonattainment under an applicable Federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors (a summary of significance thresholds established by the VCAPCD and the SCAQMD is presented in Table 4.6-16);
- Violates any air quality standard or contributes substantially to an existing or projected air quality violation;
- Exposes sensitive receptors to substantial pollutant concentrations;
- Creates objectionable odors affecting a substantial number of people; or

- Conflicts with or obstructs implementation of an applicable Federal, State, or local air quality plan.

Table 4.6-16 Significance Thresholds for Emissions in Ventura County and Los Angeles County

Pollutant	Ventura County[a]		Los Angeles County[b]	
	Significant Thresholds for Operational Emissions	Mitigation Thresholds for Construction Emissions	Significant Thresholds for Daily Construction Emissions	Significant Thresholds for Quarterly (3-Month) Construction Emissions
CO	n/a	n/a	550 lbs/day	24.75 tons/quarter
Lead[c]	n/a	n/a	3 lbs/day	n/a
NO_x	25 lbs/day	25 lbs/day	100 lbs/day	2.5 tons/quarter
PM_{10}	n/a	n/a	150 lbs/day	6.75 tons/quarter
ROC	25 lbs/day	25 lbs/day	75 lbs/day	2.5 tons/quarter
SO_2[c]	n/a	n/a	150 lbs/day	6.75 tons/quarter

Sources: VCAPCD 2003; SCAQMD 1993.

Key: n/a = not applicable.

Notes:

[a]All parts of Ventura County outside of Ojai Planning Area.

[b]Parts of Los Angeles County within the South Coast Air Basin.

[c]Pollutant is designated as attainment in the South Coast Air Basin.

4.6.4 Impact Analysis and Mitigation

Applicant-proposed measures (AM) and agency-recommended mitigation measures (MM) are defined in Section 4.1.5, "Applicant Measures and Mitigation Measures."

The emission of CO_2 and methane from the Project would not exceed any of the air quality significance criteria identified in Section 4.6.3. Potential increases in the ambient concentrations of these gases are not expected to have any appreciable impact on human health or the environment. Therefore, a discussion of CO_2 and methane emissions from the Project, as related to global warming, is provided in Section 4.20, "Cumulative Impacts Analysis."

Impact AIR-1: Net Emission Increases of Criteria Pollutants from Construction Activities in Designated Nonattainment Areas

Project construction activities in Ventura and Los Angeles Counties would generate emissions that exceed quantitative thresholds for ozone precursors, NO_x and ROCs, and CO (Class I).

Ventura County (excluding the Channel Islands) and Los Angeles County within the South Coast Air Basin are designated as Federal and State ozone nonattainment areas. Project construction activities in these counties would generate emissions of ozone precursors, NO_x and ROCs at levels that would exceed VCAPCD mitigation thresholds and SCAQMD significance thresholds (see Table 4.6-17). As discussed in Section

4.6.2, NO_x emissions from Project-related construction activities in Los Angeles County would also exceed applicability thresholds to be subject to the General Conformity Rule. As a result, the Applicant has indicated that it would fully offset annual NO_x emissions generated from Project-related construction activities in Los Angeles County. However, emission offsets for General Conformity Rule determination would be on an annual basis and, thus, daily net increases of NO_x emissions would not necessarily be reduced to a level below significance thresholds.

Table 4.6-17 Comparison of CO, NO_x, and ROC Construction Emissions with Significance Thresholds

County	Emission Source/Threshold	Daily Emissions (pounds/day)			Quarterly Emissions (tons/quarter)		
		CO	NO_x	ROCs	CO	NO_x	ROCs
Ventura[a]	Offshore pipeline installation	n/a	5,726	830	n/a	n/a	n/a
	Shore crossing construction	n/a	1,323	191	n/a	n/a	n/a
	Worker commuting	n/a	7	4	n/a	n/a	n/a
	Subtotal[b]	n/a	7,056	1,025	n/a	n/a	n/a
	Onshore pipeline installation						
	Trenching	n/a	276	43	n/a	n/a	n/a
	Pipelaying	n/a	237	60	n/a	n/a	n/a
	Boring	n/a	368	53	n/a	n/a	n/a
	Worker commuting	n/a	4	2	n/a	n/a	n/a
	Subtotal	n/a	885	158	n/a	n/a	n/a
	VCAPCD threshold for mitigation	***n/a***	***25***	***25***	***n/a***	***n/a***	***n/a***
Los Angeles	Onshore pipeline installation						
	Trenching	413	276	43	6.2	4.1	0.65
	Pipelaying	1,123	237	60	14.3	2.9	0.75
	HDD	1,060	865	125	7.9	6.5	0.95
	Worker commuting	51	4	2	3.1	0.2	0.1
	Subtotal	2,647	1,382	230	31.5	13.7	2.5
	SCAQMD significance threshold	***550***	***100***	***75***	***24.75***	***2.5***	***2.5***

Sources: VCAPCD 2003; SCAQMD 1993.

Key: n/a = not applicable.

Notes:

[a]Onshore pipeline installation scheduled to occur prior to offshore pipeline installation and shore crossing construction.

[b]Offshore pipeline installation and shore crossing construction may occur concurrently in Ventura County.

Los Angeles County within the South Coast Air Basin is designated as a CO nonattainment area. Project-related construction activities in Los Angeles County would generate CO emissions that exceed SCAQMD significance thresholds (see Table 4.6-17). There are no mitigation thresholds for CO in Ventura County for construction activities because the County is in compliance with the CO ambient air quality standards.

Since NO_x and ROCs emissions in Ventura County and NO_x, ROCs, and CO emissions in Los Angeles County exceed local significance thresholds, these Project-related construction emissions would be classified as a Class I impact.

Mitigation Measure for Impact AIR-1: Net Emission Increases of Criteria Pollutants from Construction Activities in Designated Nonattainment Areas

MM AIR-1a. **Construction Emissions Reduction Plan.** The Applicant shall prepare a Construction Emissions Reduction Plan and work with the VCAPCD and the SCAQMD to implement specific measures contained in the plan. The plan shall outline specific measures to reduce or eliminate potential impacts associated with construction-related emissions of criteria air pollutants and toxic air contaminants. At a minimum, the plan shall include the following commitments:

- Reduce emissions of diesel particulate matter and other air pollutants by using particle traps and other technological or operational methods;
- Ensure diesel-powered construction equipment is properly tuned and maintained and shut off when not in direct use;
- Prohibit engine tampering to increase horsepower;
- Locate engines, motors, and equipment as far as possible from residential areas and sensitive receptors (schools, daycare centers, and hospitals);
- Require low sulfur diesel fuel (<15 ppm by weight);
- Reduce construction-related trips of workers and equipment, including trucks;
- Require that leased and new vehicles and equipment be less than 10 years old and operate using “clean energy,” e.g., a minimum of 75 percent of the equipment’s total horsepower;
- Use engine types such as electric, liquefied gas, hydrogen fuel cells, and/or alternative diesel formulations; and
- To the extent possible, use equipment fitted with engines compliant with USEPA Tier 2, 3, or 4 standards for off-road engines.

Pursuant to the General Conformity Rule, the Applicant proposes to fully offset annual NO_x emissions generated from construction activities in Los Angeles County. In addition, implementation of the Construction Emissions Reduction Plan would lead to the use of construction equipment that emits less NO_x, ROCs, and CO than the construction equipment currently proposed for use. It is not anticipated that these measures would reduce the daily level of NO_x, ROCs, and CO emissions from

construction activities to less than the applicable VCAPCD and SCAQMD significance thresholds.

Even though CO emissions from Project-related construction in Los Angeles County would exceed SCAQMD emission significance thresholds, a screening-level dispersion modeling analysis suggests the maximum ambient CO impacts caused by these emissions that occur in proximity to construction activities would be less than applicable NAAQS and State Air Quality Standards. Similarly, the screening analysis indicates that CO ambient impacts caused by Project-related construction in Ventura County would also be less than applicable NAAQS and State Air Quality Standards. The screening-level analysis, performed with the USEPA's SCREEN3 model, is summarized in Appendix G5.

However, since Project-related emissions exceed VCAPCD and SCAQMD significance thresholds, this impact would remain a Class I impact.

Impact AIR-2: Violations of Ambient Air Quality Standards Caused by Particulate Emissions from Onshore Construction Activities

Onshore Project construction activities would generate PM_{10} and $PM_{2.5}$ emissions that could cause or contribute to existing or projected violations of NAAQS and/or State Ambient Air Quality Standards (Class I).

Los Angeles County within the South Coast Air Basin is designated as a State and Federal nonattainment area for PM_{10} and $PM_{2.5}$. Ventura County is also designated as a State nonattainment area for PM_{10} and $PM_{2.5}$. During onshore construction activities, PM_{10} and $PM_{2.5}$ emissions would be produced from internal combustion engines used in vehicles and equipment and fugitive dust generated by the operation of trucks and earth moving equipment. The PM_{10} emissions from onshore construction in Los Angeles County would be greater than SCAQMD significance thresholds (see Table 4.6-18). The SCAQMD has not established significance thresholds for $PM_{2.5}$. The VCAPCD has not established mitigation thresholds for PM_{10} or $PM_{2.5}$ emissions from construction activities in Ventura County.

Table 4.6-18 Comparison of PM_{10} and $PM_{2.5}$ Construction Emissions to SCAQMD Significance Thresholds

Emission Source/Threshold	PM_{10} Daily Emissions (lb/day)	PM_{10} Quarterly Emissions (tons/quarter)
Onshore pipeline installation		
Trenching	31	0.47
Pipelaying	146	2.0
HDD	94	0.7
Worker commuting	0.9	0.05
Subtotal	272	3.2
SCAQMD significance threshold	***150***	***6.75***

Source: SCAQMD 1993.

A screening-level dispersion modeling analysis of construction activities suggests that potential increases in ambient PM_{10} and $PM_{2.5}$ concentrations caused by construction emissions could contribute to exceedances of NAAQS and/or State Ambient Air Quality Standards. The analysis further indicates that ambient PM_{10} and $PM_{2.5}$ impacts are primarily due to fugitive dust emissions, with the highest impacts occurring in close proximity to the construction areas. Modeling was performed using the USEPA SCREEN3 model. The emissions used in the screening-level impact analysis incorporate Applicant-proposed methods for fugitive dust control. A summary of the screening analysis is presented in Appendix G5.

Since Project-related construction emissions have the potential to cause ambient particulate concentrations to exceed NAAQS or State Ambient Air Quality Standards, this impact is classified as a Class I impact.

In order to reduce fugitive dust emissions, the applicant has incorporated the following measures into the Project:

AM AIR-2a. **Fugitive Dust Controls.** The Applicant or its designated representative would provide for the following control measures:

- Excavation and moist spoils would be watered down;
- Spoil piles that remain more than a few weeks would be covered with tarps;
- Water trucks would be used for dust suppression; and
- Disturbed areas not covered with surface structures, such as buildings and pavements, would be stabilized following construction activities. This stabilization may involve planting these areas with suitable vegetation to minimize future on-site soil loss and off-site sedimentation.

Mitigation Measures for Impact AIR-2: Violations of Ambient Air Quality Standards Caused by Particulate Emissions from Onshore Construction Activities

MM AIR-2b. **Construction Fugitive Dust Plan**. The Applicant or its designated representative shall be required to develop, and submit to the VCAPCD and the SCAQMD for approval, a Construction Fugitive Dust Control Plan prior to the commencement of construction activities. The plan shall outline the steps to be taken to minimize fugitive dust generated by construction activities by:

- Describing each active operation(s) that may result in the generation of fugitive dust;
- Identifying all sources of fugitive dust, e.g., earth moving, storage piles, vehicular traffic; and

- Describing the control measures to be applied to each of the sources of dust emissions identified above. The descriptions shall be sufficiently detailed to demonstrate that the best available control measure(s) required by the SCAQMD and the VCAQMD for linear projects will be used and/or installed during all periods of active operations.

At a minimum, the control measures specified in the Construction Emissions Reduction Plan shall conform with all applicable requirements of SCAQMD Rule 403 and with the fugitive dust mitigation measures described in section 7.4.1 of the Ventura County Air Quality Assessment Guidelines (2003).

Due to potential exceedances of applicable air quality standards, this plan shall also identify specific methodologies for taking "real-time" measurements of PM_{10} and $PM_{2.5}$ ambient concentrations at locations along the boundary of the proposed construction areas. The plan shall include a description of "action levels" for these measurements and the corresponding steps to be taken, e.g., increase watering to reduce ambient particulate concentrations. The specified monitoring methodologies included in this plan must meet the approval of the VCAPCD and the SCAQMD.

The Applicant or its designated representative shall obtain prior approval from the SCAQMD or the VCAPCD prior to any deviations from fugitive dust control measures specified in the Construction Fugitive Dust Plan. A justification statement used to explain the technical or safety reason(s) that preclude the use of required fugitive dust control measure(s) shall be submitted to the appropriate agency for review.

MM AIR-1a. **Construction Emissions Reduction Plan** would apply to this impact.

Implementation of the Construction Emissions Reduction Plan (MM AIR-1a) would lead to the use of equipment engines and control equipment that would emit less PM_{10} and $PM_{2.5}$. Measures required under the Construction Fugitive Dust Plan (MM AIR-2b) would serve to limit the generation of fugitive dust caused by construction activities. In addition, the Applicant would be required to monitor ambient concentrations of PM_{10} and $PM_{2.5}$ during construction activities and take appropriate actions to avoid violations of ambient air quality standards. Despite these mitigation measures, the potential for onshore construction activities to cause an exceedance of applicable ambient air quality standards would remain a Class I impact.

Impact AIR-3: Violations of Ambient Air Quality Standards, Exposure of the Public to Substantial Pollutant Concentrations, and/or Creation of Objectionable Odors Caused by an Accidental LNG Spill or Pipeline Rupture

Although rare, an LNG spill from the FSRU or a pipeline rupture would result in a natural gas release and/or a fire that could cause temporary increases in ambient air concentrations of criteria pollutants in excess of air quality standards, expose sensitive receptors and the general public to substantial concentrations of toxic air contaminants, and/or create objectionable odors (Class I).

The accident scenarios evaluated in Section 4.2, "Public Safety: Hazards and Risk Analysis," and the Independent Risk Assessment (Appendix C1) include release and ignition of natural gas formed by evaporation of LNG spilled from the FSRU and from a rupture of the natural gas transmission pipelines. A release of natural gas would also result in release of odorants, i.e., mercaptans, which have been added to the gas for detection purposes. Complete combustion of natural gas would theoretically produce only CO_2, water, and heat. However, even under controlled conditions, e.g., in a flare, generator, or furnace, natural gas combustion typically is not complete. The products of incomplete combustion of natural gas include criteria pollutants, ozone precursors, and toxic air contaminants.

A fire resulting from an LNG spill at the FSRU could result in a pool fire. Under this condition, it is unlikely that the fuel/air mix throughout the evaporating cloud would always be maintained at ideal levels to support complete combustion. The center of a large pool fire may often be fuel-rich (oxygen-deficient), which would result in the formation of soot. These minute solid carbon particles can increase the flame radiation (the amount of radiated heat), which can in turn increase the burning rate. In the hottest portions of the fire, secondary combustion of the soot is possible, which would reduce the amount of smoke produced by the fire. However, particulates can also be carried to cooler portions of the fire at the outer edges of the plume, transported upward to mix with relatively cooler air, or carried to regions of the plume where the fuel/air mix is too lean to burn.

The maximum increases in ambient pollutant concentrations due to the natural gas fire would occur in proximity to the LNG spill. During the fire, ambient air pollutant concentrations in the areas adjacent to the spill site (including nearby traffic lanes) could potentially exceed short-term, i.e., 1-hour to 24-hour, NAAQS and State Ambient Air Quality Standards over the duration of the fire. Air pollutant impacts could also be transported to onshore areas. However, given the distance to shore from a potential fire, it is unlikely that sensitive receptors, i.e., schools, day care centers, hospitals, retirement homes, convalescence facilities, and residences, would be exposed to substantial pollutant concentrations.

Pipeline accidents rarely, but do, occur. During an accidental rupture of the natural gas transmission line, natural gas would escape to the atmosphere or ignite, causing a fire. Under this scenario, the maximum increases in ambient pollutant concentrations would occur close to the pipeline rupture. A large leak of un-ignited natural gas would cause

objectionable odors at locations downwind of the pipeline. During a fire, air pollutant concentrations could potentially exceed short-term, i.e., 1-hour to 24-hour, NAAQS and State Ambient Air Quality Standards in nearby areas. Depending on the size and location of the rupture, a fire or natural gas leak would also expose the public (including sensitive receptors) to substantial pollutant concentrations.

The Applicant has proposed the following measures to reduce the risk of an LNG spill or pipeline rupture (see Section 4.2, "Public Safety: Hazards and Risk Analysis," and Section 4.12, "Hazardous Materials," for details):

AM PS-3a. **More Stringent Pipeline Design** would apply to this impact (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

AM PS-4a. **Class 3 Pipeline Design Criteria** would apply to this impact (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

Mitigation Measures for Impact AIR-3: Violations of Ambient Air Quality Standards, Exposure of the Public to Substantial Pollutant Concentrations, and/or Creation of Objectionable Odors Caused by an Accidental LNG Spill or Pipeline Rupture

MM PS-3c. **Areas Subject to Accelerated Corrosion, Cathodic Protection System** would apply to this impact (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

MM PS-4c. **Install Additional Mainline Valves Equipped with Either Remote Valve Controls or Automatic Line Break Controls** would apply to this impact (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

MM PS-4d. **Treat Shore Crossing as Pipeline HCA** would apply to this impact (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

MM PS-4e. **Automatic Monitoring for Flammable Gas** would apply to this impact (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

MM PS-4f. **Emergency Communication and Warnings** would apply to this impact (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

MM PS-5a. **Treat Manufactured Home Residential Community as a High Consequence Area** would apply to this impact (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

Applicant measures AM PS-3a and AM PS-4a and mitigation measure MM PS-3c would reduce the likelihood of leaks of natural gas that could result in pipeline accidents. MM PS-4c would limit the affected area from a potential pipeline accident. MM PS-4e would improve the detection of natural gas leaks. MMs PS-4d and PS-5a would improve the

integrity of the pipeline where people would be located. MM PS-4f would improve the effectiveness of emergency response to an accident if it were to occur. However, this impact would exceed air quality significance criteria after application of these mitigation measures and would therefore remain a Class I impact.

Impact AIR-4: Emissions of Ozone Precursors from the FSRU

Emissions of NO_x and ROC generated from FSRU equipment could contribute to ambient ozone impacts in the areas located downwind of the Project (Class II).

FSRU equipment would generate emissions of ozone precursors, NO_x and ROCs. The CARB states a concern that "these emissions [from offshore activities] can reach the California coastline and add to the air pollution burden of downwind regions, e.g., South Coast Air Basin . . ." (Simeroth 2005). As discussed in Section 4.6.2, the USEPA has proposed to permit the FSRU in the same manner as sources on the Channel Islands, which are a Federal attainment area for ozone. The USEPA has indicated that it would propose to issue an Authority to Construct permit for the FSRU in accordance with VCAPCD Rule 10, and based on an analysis of the Deepwater Port Act and VCAPCD rules, the USEPA concluded that VCAPCD Rule 26 would not apply to the FSRU; therefore, emission offsets would not be required for Project sources constructed in the area where the FSRU is proposed to be sited (Zimpfer 2005a). The USEPA has further stated that the FSRU would not trigger the requirements of Prevention of Significant Deterioration (PSD) because potential emissions are less than PSD major source thresholds.

To minimize air quality impacts, the Applicant incorporated the following measure into the proposed Project:

AM AIR-4a. **Emission Reduction Programs.** As part of air permit-to-construct application procedures, the Applicant has committed to the USEPA, the CARB, and local air districts to identify a suitable emission reduction program (in addition to reductions inherent to the Project) that would reduce annual emissions of NO_x by an amount up to the FSRU's annual NO_x emissions.

As proposed, a NO_x emission reduction program (AM AIR-4a) would likely be as effective in mitigating ambient ozone concentrations in onshore air basins as would corresponding emission reductions occurring at the FSRU. Thus, this measure would provide for emission reductions that reduce impacts to below significance criteria.

Impact AIR-5: Emissions of Ozone Precursors from Project Vessels Operating in California Coastal Waters

Emissions of NO_x and ROC generated from LNG carriers, tugboats, and the crew/supply boat operating in California Coastal Waters could contribute to ambient ozone impacts in the areas located downwind of the Project (Class I).

LNG carriers, tugboats, and the crew/supply boat would generate emissions of ozone precursors, NO_x, and ROCs, during operation in California Coastal Waters. California Coastal Waters extend varying distances from the California coast and are defined by the CARB as "the boundary within which emissions that are released are transported onshore" (Simeroth 2005). The CARB further states that it "has jurisdiction within California Coastal Waters as discussed in the documents "Report to the California Legislature on Air Pollutant Emissions from Marine Vessels, June 1984, Volume 7, Appendix H and Appendix J." According to the CARB's definition, pollutant emissions released over these waters are likely to be ducted under or within the inversion layer to the California coast and inland under prevailing summertime airflow conditions.

Total annual NO_x and ROC emissions from Project vessels operating in California Coastal Waters would be 164.1 and 22.9 tons per year, respectively. Of these totals, annual NO_x and ROC emissions within Ventura County waters would be 1.1 and 22.9 tons per year, respectively. All other vessel emissions would occur outside the boundary of any California county, i.e., in Federal waters.

The greatest level of Project vessel operation in Ventura County waters would occur on days when both a tugboat and a crew/supply boat make transits between the FSRU and Port Hueneme. Under this situation, the daily NO_x and ROC emissions from Project vessels would be 33 and 4.5 pounds per day, respectively. Thus, daily NO_x emissions could exceed the significance threshold of 25 pounds per day established by the VCAPCD.

As discussed under Impact AIR-4, the CARB is concerned about impacts downwind of emissions from all offshore Project activities. Thus, the CARB has stated, "…For the purposes of the Project, CARB staff believes it is appropriate to mitigate emissions within 24 NM of the California mainland coastline. We believe this will address the majority of emissions from the Project and maximize the potential on-shore benefits…Although the CARB has not established relevant significance criteria, these emissions clearly exceed the significance thresholds of 55 pounds per day for NO_x emissions that the SCAQMD, the district most affected, has established" (Simeroth 2005).

To minimize emissions and subsequent air quality impacts, the Applicant incorporated the following measures into the proposed Project:

AM AIR-5a. **Natural Gas Only on Project Vessels.** The Applicant has proposed to use natural gas as the primary fuel in the main and auxiliary engines on the LNG carriers, tug supply boats, and crew boat whenever these vessels are berthed at the FSRU or operating within 25 miles of the coast of California. A small amount of California diesel would be used simultaneously as a pilot fuel in LNG carrier, tugboat and crew/supply boat engines resulting in a fuel mixture with a natural gas to diesel ratio of approximately 99:1.

AM AIR-5b. Reduced Vessel Traffic Between the FSRU and Port Hueneme. The Applicant has proposed to reduce, by more than half, the number of weekly and annual transits made by the crew boat/supply boat to and from Port Hueneme and the FSRU from the original estimates in the October 2004 Draft EIS/EIR.

Mitigation Measure for Impact AIR-5: Emissions of Ozone Precursors from Project Vessels Operating in California Coastal Waters

MM AIR-5c. Consultation with CARB to Identify Emission Reduction Opportunities. The Applicant shall continue to consult with the CARB in an effort to identify and implement additional emission reduction opportunities in Ventura County and/or the South Coast Air Basin, such as unfunded Carl Moyer projects, that would mitigate emissions generated from Project vessels operating in Federal waters.

The Applicant would reduce Project NO_x and ROC emissions through the use of natural gas in the engines of Project vessels instead of the more typical heavy oil (AM AIR-5a) and reductions to vessel traffic (AM AIR-5b). As stated above, total annual NO_x and ROC emissions from Project vessels operating in California Coastal Waters would be 164.1 and 22.9 tons per year, respectively. Currently, no mitigation is identified for these emissions.

However, the issue of emission reductions to mitigate emissions from Project vessels operating in Federal waters/California Coastal Waters is not yet resolved between the Applicant and the CARB. The Applicant does not propose to mitigate vessel emissions beyond those achieved through the use of natural gas and reduced vessel traffic, and it is the position of the CARB that total Project vessel emissions should be mitigated to the extent feasible and reasonable. Pending resolution between CARB and the Applicant regarding CARB's California Coastal Waters policy and whether emission reductions are necessary under such policy (MM AIR-5c), the status of this impact from the Project, as presently proposed, cannot be determined at this time. Due to the uncertainty associated with any potential resolution, the emissions from Project vessels operating in California Coastal Waters are tentatively presumed, within the meaning of CARB's position (Simeroth 2005), to result in a considerable net increase of ozone precursors, thus resulting in a Class I impact.

Impact AIR-6: Emissions of Ozone Precursors from Project Construction Activities in Federal Waters

Project construction activities in Federal waters would generate emissions of NO_x and ROCs that could contribute to ambient ozone impacts in the areas located downwind of the Project (Class III).

Project construction activities in Federal waters would generate emissions of ozone precursors, NO_x and ROCs. Federal waters are unclassified with respect to NAAQS;

thus, significance thresholds set forth by the VCAPCD and the SCAQMD are not applicable in the determination of the significance of these emissions. In order to assess the significance of potential impacts, construction emissions that would be generated in Federal waters were compared with emission forecasts developed by the VCAPCD and the SCAQMD for offshore and onshore sources located in Ventura County and the South Coast Air Basin, respectively (see Table 4.6-19).

Table 4.6-19 Comparison of Construction Emissions in Federal Waters to Region-Wide Emission Forecasts

Emission Source	Daily Emissions (tons per day)	
	NO_x	ROCs
Project construction emissions – mooring/FSRU installation	2.2	0.3
Project construction emissions – offshore pipeline installation	2.9	0.4
Emission forecasts for offshore emissions for Ventura County and the South Coast Air Basin (Outer Continental Shelf, tideland shipping, ships, and commercial boats)	69.1	6.1
Emission forecasts for onshore and offshore emissions for Ventura County and the South Coast Air Basin (all sources)	831.8	673.6

Sources: VCAPCD 1995; SCAQMD 2003.

This comparison suggests that Project construction emissions in Federal waters would represent a moderate fraction of anticipated regional offshore emissions but only a small fraction of overall regional emissions. These emissions would occur for only a relatively short duration, i.e., 24 days for mooring installation and 35 days for offshore pipelaying, and are not expected to occur during May through October, which is the period of historical high ozone concentrations for the region. Given the level of these emissions and the relatively short duration of construction, Project construction in Federal waters would not result in a cumulatively considerable net increase of ozone precursors, and thus, would not be expected to contribute substantially to existing ambient ground-level ozone impacts.

Mitigation Measure for Impact AIR-6: Emissions of Ozone Precursors from Project Construction Activities in Federal Waters

MM AIR-1a. **Construction Emissions Reduction Plan** would apply to this impact.

The implementation of the Construction Emissions Reduction Plan (AM AIR-1a) would provide a further lessening of potential adverse impacts already considered not to exceed any significance criteria.

Impact AIR-7: Temporary Ambient Air Quality Impacts Caused by Air Pollutant Emissions from Onshore and Offshore Construction Activities

Air pollutants emitted during onshore and offshore Project construction activities would cause temporary increases in ambient pollutant concentrations (Class III).

Project construction activities would generate emissions of criteria pollutants and air toxic contaminants. This impact discussion relates to all air pollutant emissions from construction except for emissions of ozone precursors (NO_x and ROC), CO, PM_{10}, and $PM_{2.5}$ generated from construction activities in Ventura and Los Angeles Counties (see Impacts AIR-1 and AIR-2) and emissions of ozone precursors (NO_x and ROC) generated from construction activities in Federal waters (see Impact AIR-6).

A screening-level impact analysis of SO_2 emissions from onshore construction activities suggests that potential increases to ambient pollutant concentrations caused by these emissions would neither violate any air quality standards nor contribute substantially to existing or projected air quality violations. Further, SO_2 emissions from construction in Los Angeles County are well below SCAQMD significance thresholds (the VCAPCD has not established SO_2 mitigation thresholds). The screening-level analysis was performed with SCREEN3. A summary of this screening-level analysis is provided in Appendix G5.

A screening-level analysis of air toxic emissions from onshore diesel construction equipment suggests that potential increases to the ambient concentrations of these pollutants would not expose sensitive receptors to substantial pollutant concentrations. Further, emissions of lead (a listed air toxic) from construction in Los Angeles County are well below SCAQMD significance thresholds for lead. (The VCAPCD has not established mitigation thresholds for lead.) The CARB's Hotspots Analysis and Reporting Program (HARP) model, used to estimate the impacts caused by air toxic emissions from onshore construction activities, predicted total acute and chronic cancer risks that were then compared with an acute hazard index and chronic risk criteria. A summary of the HARP analysis is provided in Appendix G6.

A screening-level impact analysis of criteria pollutants emitted from offshore construction activities suggests that potential increases in ambient pollutant concentrations caused by these emissions would neither violate any air quality standards nor contribute substantially to existing or projected air quality violations. A screening-level analysis of air toxic emission impacts on ambient air quality from offshore construction activities was not conducted. However, given the distance from offshore construction activities to the nearest onshore receptors, potential increases in the ambient concentrations of air toxics emitted from offshore construction activities would not be likely to result in an adverse impact to sensitive receptors or the general public onshore. Therefore, air pollutants emitted during onshore and offshore Project construction activities would be a Class III impact.

Mitigation Measures for Impact AIR-7: Temporary Ambient Air Quality Impacts Caused by Air Pollutant Emissions from Onshore and Offshore Construction Activities

MM AIR-1a. Construction Emissions Reduction Plan would apply to this impact.

Implementation of the Construction Emissions Reduction Plan would lead to the use of equipment engines and control equipment that would emit fewer air pollutants. Thus, this mitigation measure would provide a further lessening of potential adverse impacts that would not exceed any significance criteria.

Impact AIR-8: Ambient Air Quality Impacts Caused by Air Pollutant Emissions from the FSRU and Project Vessels

Air pollutants emitted from FSRU equipment and Project vessels associated with operations would cause increases in ambient pollutant concentrations (Class III).

FSRU equipment and Project vessels, i.e., LNG carriers, tugboats, and crew boats, would emit air pollutants. This impact discussion relates to all air pollutant emissions related to operational activities except for NO_x and ROCs emissions from these activities (see Impacts AIR-4 and AIR-5).

The dispersion of air pollutants from these emission sources would cause an increase in the ambient air concentrations of each pollutant at downwind locations in the Pacific Ocean and along the coast of California. However, an air quality analysis of criteria pollutants emitted from FSRU equipment and Project vessels indicates that the projected increases in the ambient concentrations of criteria pollutants would neither violate any applicable air quality standards nor contribute substantially to existing or projected air quality violations. The analysis was conducted with the Offshore and Coastal Dispersion Model (see Appendix G7 for a summary of the analysis).

A separate screening-level analysis indicates that NH_3 emissions from FSRU equipment would result in projected increases in ambient NH_3 concentrations that would not exceed any of the stated significance criteria. The screening-level analysis was performed with SCREEN3. A summary of this screening-level analysis is provided in Appendix G8.

Given the distance of 12.01 NM (13.83 miles or 22.25 km) from the FSRU and most vessel operations to the nearest onshore receptors, potential increases in the ambient concentrations of air toxics emitted from these offshore operational activities were presumed not to expose sensitive receptors or the general public to substantial pollutant concentrations. Therefore, this would be a Class III impact.

Impacts, Applicant measures, and mitigation measures associated with air quality are summarized in Table 4.6-20.

Table 4.6-20 Summary of Air Quality Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Impact AIR-1: Project construction activities in Ventura and Los Angeles Counties would generate emissions that exceed quantitative thresholds for ozone precursors, NO_x and ROCs, and CO (Class I).	**MM AIR-1a. Construction Emissions Mitigation Plan.** The Applicant shall prepare a Construction Emissions Reduction Plan and work with the VCAPCD and the SCAQMD to implement specific measures contained in the plan. The plan shall outline specific measures to mitigate potential impacts associated with construction-related emissions of criteria air pollutants and toxic air contaminants.
Impact AIR-2: Onshore Project construction activities would generate PM_{10} and $PM_{2.5}$ emissions that could cause or contribute to existing or projected violations of NAAQS and/or State Ambient Air Quality Standards (Class I).	**AM AIR-2a. Fugitive Dust Controls.** The Applicant or the designated representative would provide for the following control measures: excavation and moist spoils would be watered down; spoil piles that remain more than a few weeks would be covered with tarps; water trucks would be used for dust suppression; and disturbed areas not covered with surface structures would be stabilized following construction. **MM AIR-2b. Construction Fugitive Dust Plan**. The Applicant or its designated representative shall be required to develop, and submit for approval, a Construction Fugitive Dust Control Plan prior to the commencement of construction activities. The plan shall outline the steps to be taken to minimize fugitive dust generated by construction activities by: • Describing each active operation(s) that may result in the generation of fugitive dust; • Identifying all sources of fugitive dust, e.g., earth moving, storage piles, vehicular traffic; and • Describing the control measures to be applied to each of the sources of dust emissions identified above. The descriptions shall be sufficiently detailed to demonstrate that the best available control measure(s) required by the SCAQMD and the VCAQMD for linear projects will be used and/or installed during all periods of active operations. At a minimum, the control measures specified in the Construction Emissions Reduction Plan shall conform with all applicable requirements of SCAQMD Rule 403 and with the fugitive dust mitigation measures described in section 7.4.1 of the Ventura County Air Quality Assessment Guidelines (2003).

Table 4.6-20 Summary of Air Quality Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
	Due to potential exceedances of applicable air quality standards, this plan shall also identify specific methodologies for taking "real-time" measurements of PM_{10} and $PM_{2.5}$ ambient concentrations at locations along the boundary of the proposed construction areas. The plan shall include a description of "action levels" for these measurements and the corresponding steps to be taken, e.g., increase watering to reduce ambient particulate concentrations. The specified monitoring methodologies included in this plan must meet the approval of the VCAPCD and the SCAQMD. The Applicant or its designated representative shall obtain prior approval from the SCAQMD or the VCAPCD prior to any deviations from fugitive dust control measures specified in the Construction Fugitive Dust Plan. A justification statement used to explain the technical or safety reason(s) that preclude the use of required fugitive dust control measure(s) shall be submitted to the appropriate agency for review. **MM AIR-1a. Construction Emissions Reduction Plan.**
Impact AIR-3: Although rare, an LNG spill from the FSRU or a pipeline rupture would result in a natural gas release and/or a fire that could cause temporary increases in ambient air concentrations of criteria pollutants in excess of air quality standards, expose sensitive receptors and the general public to substantial concentrations of toxic air contaminants, and/or create objectionable odors (Class I).	**AM PS-3a**. **More Stringent Pipeline Design** (see Section 4.2, "Public Safety: Hazards and Risk Analysis"). **AM PS-4a**. **Class 3 Pipeline Design Criteria** (see Section 4.2, "Public Safety: Hazards and Risk Analysis"). **MM PS-3c. Areas Subject to Accelerated Corrosion, Cathodic Protection System** (see Section 4.2, "Public Safety: Hazards and Risk Analysis"). **MM PS-4c. Install Additional Mainline Valves Equipped with Either Remote Valve Controls or Automatic Line Break Controls** (see Section 4.2, "Public Safety: Hazards and Risk Analysis"). **MM PS-4d. Treat Shore Crossing as Pipeline HCA** (see Section 4.2, "Public Safety: Hazards and Risk Analysis"). **MM PS-4e. Automatic Monitoring for Flammable Gas** (see Section 4.2, "Public Safety: Hazards and Risk Analysis"). **MM PS-4f. Emergency Communication and Warnings** (see Section 4.2, "Public Safety: Hazards and Risk Analysis"). **MM PS-5a. Treat Manufactured Home Residential Community as a High Consequence Area** (see Section 4.2, "Public Safety: Hazards and Risk Analysis").

Table 4.6-20 Summary of Air Quality Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Impact AIR-4: Emissions of NO_x and ROC generated from FSRU equipment could contribute to ambient ozone impacts in the areas downwind of the Project (Class II).	**AM AIR-4a. Emission Reduction Programs.** As part of air permit-to-construct application procedures, the Applicant has committed to the USEPA, the CARB, and local air districts to identify a suitable emission reduction program (in addition to reductions inherent to the Project) that would reduce annual emissions of NO_x by an amount up to the FSRU's annual NO_x emissions.
Impact AIR-5: Emissions of NO_x and ROC generated from LNG carriers, tugboats, and the crew/supply boat operating in California Coastal Waters could contribute to ambient ozone impacts in the areas located downwind of the Project (Class I).	**AM AIR-5a. Natural Gas Only on Project Vessels.** The Applicant has proposed to use natural gas as the primary fuel in the main and auxiliary engines on the LNG carriers, tug supply boats, and crew boat whenever these vessels are berthed at the FSRU or operating within 25 miles of the coast of California. A small amount of California diesel would be used simultaneously as a pilot fuel in LNG carrier, tugboat and crew/supply boat engines resulting in a fuel mixture with a natural gas to diesel ratio of approximately 99:1. **AM AIR-5b. Reduced Vessel Traffic Between the FSRU and Port Hueneme.** The Applicant has proposed to reduce, by more than half, the number of weekly and annual transits made by the crew boat/supply boat to and from Port Hueneme and the FSRU from the original estimates in the October 2004 Draft EIS/EIR. **MM AIR-5c. Consultation with CARB to Identify Emission Reduction Opportunities.** The Applicant shall continue to consult with the CARB in an effort to identify and implement additional emission reduction opportunities in Ventura County and/or the South Coast Air Basin, such as unfunded Carl Moyer projects, that would mitigate emissions generated from Project vessels operating in Federal waters.
Impact AIR-6: Project construction activities in Federal waters would generate emissions of NO_x and ROCs that could contribute to ambient ozone impacts in the areas located downwind of the Project (Class III).	**MM AIR-1a. Construction Emissions Reduction Plan**.
Impact AIR-7: Air pollutants emitted during onshore and offshore Project construction activities would cause temporary increases in ambient pollutant concentrations (Class III).	**MM AIR1-a. Construction Emissions Reduction Plan**.
Impact AIR-8: Air pollutants emitted from FSRU equipment and Project vessels associated with operations would cause increases in ambient pollutant concentrations (Class III).	None.

4.6.5 Alternatives

4.6.5.1 No Action Alternative

As explained in greater detail in Section 3.4.1, “No Action Alternative,” under the No Action Alternative, MARAD would deny the license for the Cabrillo Port Project and/or the CSLC would deny the application for the proposed lease of State tide and submerged lands for a pipeline ROW. The No Action Alternative means that the Project would not go forward and the FSRU, associated subsea pipelines, and onshore pipelines and related facilities would not be installed. Accordingly, none of the potential environmental impacts identified for the construction and operation of the proposed Project would occur.

Since the proposed Project is privately funded, it is unknown whether the Applicant would fund another energy project in California; however, should the No Action Alternative be selected, the energy needs identified in Section 1.2, "Project Purpose, Need and Objectives," would likely be addressed through other means, such as through other LNG or natural gas-related pipeline projects. Such proposed projects may result in potential environmental impacts of the nature and magnitude of the proposed Project as well as impacts particular to their respective configurations and operations; however, such impacts cannot be predicted with any certainty at this time.

4.6.5.2 Alternative Deepwater Port, Subsea Pipelines, Shore Crossing, and Onshore Pipeline Location – Santa Barbara Channel/Mandalay Shore Crossing/Gonzales Road Pipeline Alternative

Compared to the proposed Project, emissions generated from FSRU and vessel operation for this alternative would be unchanged, but would take place closer to the California shoreline; it is expected that the differences in onshore and offshore ambient impacts would be minimal. An emission reduction program would be used to reduce ozone precursor emissions from FSRU stationary sources to a Class II impact. As with the Project as proposed, ozone precursor emissions from Project vessels operating in California Coastal Waters are only tentatively presumed to result in a considerable net increase of ozone precursors (Class I impact) pending resolution between the CARB and the Applicant regarding these emissions. The air quality impacts associated with the emissions of all other air pollutants from FSRU and vessel operation would not exceed any significance criteria and would be Class III impacts.

Emissions generated over the course of offshore construction for this alternative would be slightly less than Project emissions because of the shorter offshore pipeline route but would take place closer to the California shoreline. Daily offshore emissions would remain equivalent to those for the Project. Although activities under this alternative would occur closer to the coastline, it is expected that the differences in onshore ambient impacts would be minimal, and therefore are unlikely to exceed air quality standards. The air quality impacts due to offshore construction would not exceed any significance criteria and would be Class III impacts.

Compared to the Project, emissions generated over the course of onshore construction activities for this alternative would increase slightly because the pipeline route to the Center Road Valve Station would travel through a more densely populated area, resulting in a longer construction schedule. However, daily emissions would remain equivalent to those for the Project. Since air quality impacts are closely related to daily emissions, impacts from this alternative's onshore construction activities would be the same as those for the Project. Despite implementation of mitigation measures, NO_x and ROCs emissions (and CO emissions in Los Angeles County) would exceed significance thresholds, and $PM_{10}/PM_{2.5}$ emissions would have the potential to cause exceedances of ambient air quality standards. Therefore, these impacts would be Class I and the mitigation measures applied to the Project would also be implemented for this alternative. The air quality impacts from other air pollutants emitted during onshore construction would not exceed any significance criteria. Therefore, the impacts would be Class III with no mitigation required.

Under this alternative, air quality impacts caused by an LNG spill or pipeline rupture would be the same as those for the proposed Project. Despite implementation of mitigation measures, air quality impacts associated with these events could exceed ambient air quality standards, expose the public to substantial pollutant concentrations, and/or create objectionable odors. Therefore, these impacts would be Class I and the mitigation measures applied for the Project would also be implemented for this alternative.

4.6.5.3 Shore Crossing Alternatives

The air quality impacts associated with operational activities and offshore construction for the shore crossing alternatives would be identical to corresponding impacts for the proposed Project regardless of the shore crossing locations. Therefore, the following analysis reflects only the differences in impacts resulting from onshore construction activities.

Point Mugu Shore Crossing/Casper Road Pipeline Alternative

Under this alternative, the duration of shore crossing and pipeline construction would be equivalent to corresponding construction for the Project. Thus, construction emissions for this alternative would be the same as those for the Project. Despite implementation of mitigation measures, NO_x and ROCs emissions in combination with the emissions in the remainder of the pipeline route in Ventura County would exceed significance thresholds, and $PM_{10}/PM_{2.5}$ emissions would have the potential to cause exceedances of ambient air quality standards. Therefore, these impacts would be Class I and the mitigation measures applied for the Project would also be implemented for this alternative. The air quality impacts from other air pollutants emitted during onshore construction would not exceed any significance criteria. Therefore, these impacts would be Class III with no mitigation required.

Arnold Road Shore Crossing/Arnold Road Pipeline Alternative

Under this alternative, the duration of shore crossing and pipeline construction would be equivalent to corresponding construction for the Project. Thus, construction emissions for this alternative would be the same as those for the Project. Despite implementation of mitigation measures, NO_x and ROCs emissions, in combination with the construction emissions on the remainder of the pipeline route in Ventura County, would exceed significance thresholds, and $PM_{10}/PM_{2.5}$ emissions would have the potential to cause exceedances of ambient air quality standards. Therefore, these impacts would be Class I and the mitigation measures applied for the Project would also be implemented for this alternative. The air quality impacts from other air pollutants emitted during onshore construction would not exceed any significance criteria. Therefore, these impacts would be Class III with no mitigation required.

4.6.5.4 Alternative Onshore Pipeline Routes

The air quality impacts associated with operational activities and offshore construction for the onshore pipeline route alternatives would be identical to corresponding impacts for the proposed Project regardless of the onshore pipeline route selected. Therefore, the following analysis compares only the differences in onshore construction activities.

Center Road Pipeline Alternative 1

The emissions generated over the course of onshore construction for this alternative would be equivalent to those generated from the Project because although the pipeline route would be longer, it would traverse less densely populated areas. Since air quality impacts are closely related to daily emissions, impacts from onshore construction under this alternative would be the same as those for the Project. Despite implementation of mitigation measures, NO_x and ROCs emissions would exceed significance thresholds, and $PM_{10}/PM_{2.5}$ dust emissions would have the potential to cause exceedances of ambient air quality standards. Therefore, these impacts would be Class I and the mitigation measures applied for the Project would also be implemented for this alternative. The air quality impacts from other air pollutants emitted during onshore construction would not exceed any significance criteria. Therefore, these impacts would be Class III with no mitigation required although MM AIR-1a would be applied.

Center Road Pipeline Alternative 2

Under this alternative, the duration of pipeline construction would be equivalent to the corresponding construction for the proposed Project. Thus, construction emissions for this alternative would be the same as those for the Project. Despite implementation of mitigation measures, NO_x and ROCs emissions would exceed significance thresholds, and $PM_{10}/PM_{2.5}$ emissions would have the potential to cause exceedances of ambient air quality standards. Therefore, these impacts would be Class I and the mitigation measures applied for the Project would also be implemented for this alternative. The air quality impacts from other air pollutants emitted during onshore construction would not

exceed any significance criteria. Therefore, these impacts would be Class III with no mitigation required although MM AIR-1a would be applied.

Center Road Pipeline Alternative 3

Under this alternative, the duration of pipeline construction would be equivalent to corresponding construction for the Project. Thus, construction emissions for this alternative would be the same as those for the Project. Despite implementation of mitigation measures, NO_x and ROCs emissions would exceed significance thresholds and $PM_{10}/PM_{2.5}$ emissions would have the potential to cause exceedances of ambient air quality standards. Therefore, these impacts would be Class I and the mitigation measures applied for the Project would also be implemented for this alternative. The air quality impacts from other air pollutants emitted during onshore construction would not exceed any significance criteria. Therefore, these impacts would be Class III with no mitigation required although MM AIR-1a would be applied.

Line 225 Pipeline Loop Alternative

As compared with the Project, the emissions generated over the course of onshore trenching and pipelay construction activities for this alternative would decrease slightly because the Line 225 Pipeline Loop route would be shorter and traverse more open land, resulting in a shorter construction schedule. However, daily emissions would remain equivalent to those for the Project. Since air quality impacts are closely related to daily emissions, impacts from onshore trenching and pipelay construction under this alternative would be the same as those for the Project.

Under the Project, the Line 225 Pipeline Loop would cross the Santa Clara River within the State Route 126 bridge. Under this alternative, the Line 225 Pipeline Loop would cross the Santa Clara River by either utilizing an existing pipe bridge or by drilling under the river with HDD. If HDD is used, emissions would increase because of additional equipment requirements. Installation of the pipeline beneath the Santa Clara River using HDD would take approximately three months, with drilling being conducted 24 hours per day/seven days per week.

Despite implementation of mitigation measures, NO_x, ROCs, and CO emissions would exceed significance thresholds and $PM_{10}/PM_{2.5}$ emissions would have the potential to cause exceedances of ambient air quality standards. Therefore, these impacts would be Class I and the mitigation measures applied for the Project would also be implemented for this alternative. The air quality impacts from other air pollutants emitted during onshore construction would not exceed any significance criteria. Therefore, these impacts would be Class III with no mitigation required although MM AIR-1a would be applied.

4.6.6 References

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